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ARGUMENT

OF

WILLIAM WHITING, Esq.,

IN THE CASE OF

ROSS WINANS v. ORSAMUS EATON et al.,

FOR AN ALLEGED

INFRINGEMENT OF HIS

PATENT FOR THE EIGHT-WHEEL RAILROAD CAR.

BEFORE

HON. SAMUEL NELSON,

JUSTICE OF THE UNITED STATES CIRCUIT COURT FOR THE

NORTHERN DISTRICT OF NEW YORK.

PHONOGRAPHICALLY REPORTED

By Arthur Cannon, of Philadelphia.

BOSTON:
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1853 Oct 29

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ARGUMENT.

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INJUNCTION.

May it please your Honor:—

The great length to which this trial has been protracted, the unusual array of counsel, the thorough preparation of the evidence, and the elaborate arguments, which we have heard with so much pleasure, indicate that this cause is believed to be one of no ordinary importance. If success shall crown their enterprise, the parties really interested in the patent of Ross Winans, will be enabled to grasp a speculation worthy to be styled "magnificent."

Nor is the result of this struggle of less moment to the Respondents, Messrs. Eaton, Gilbert and Company. But however deeply the issue of this trial may affect the rights of the parties to the Record, their private contests sink into insignificance compared with the great public interests which must be affected by your decision.

Accidentally perusing a New York newspaper this morning, I observed the following paragraph:—

"The cost of one of the long railway passenger cars is, on an average, about $2,000. There are, in the United States, upwards of eighty private car manufactories, exclusive of those railways which make and repair all for their use, and it is calculated that a capital of $6,000,000 is invested in this branch of industry, producing about $17,000,000 annually, and employing about six thousand men."

Whether that is an accurate statement, or on what authority it is founded, we know not; but there is, beyond doubt, a vast amount of capital and many thousands of workmen employed in constructing eight-wheel cars for Railroad Companies in different sections of the country. The questions involved in these suits in equity, therefore, may be deemed, in no inconsiderable degree, as public questions. The same reasons which would authorize an injunction against the Respondents would require the Court to enjoin all the railroads of the State of New York; and will lay the foundation in every Circuit Court of the United States, for putting a stop to the railway travel in the cars now in general use. It is rarely that we have known, or been connected with any cause, which affects a greater variety of public and private interests than that which is now before this Court. And it is our good fortune to appear before a tribunal patient in investigating truth and anxious to administer justice, with even hand, no less to the unknown stranger than to the familiar friend. And if, indeed,—a prayer had really been made for process to run throughout every State of this Union, and that prayer were now under consideration, this Court would feel no higher responsibility than it now feels in pronouncing judgment in this case, and thus giving a direction to the judicial mind of the country.

This cause is important in another aspect; namely, as settling, or tending to settle novel and intricate questions of law relating to patents, arising not merely in this case, but affecting many others. We will not linger upon this view of the subject, feeling confident that it must long since have attracted the attention of the Court. We feel sure that your Honor will consider, with anxious deliberation, questions which embrace such vast interests, and on the decision of which the business, the property and the pursuits of so many thousands of individuals depend.

What are the grounds upon which the Complainant asks for *your Honor's interposition?* As I understand the learned counsel on the opposite side, they say that the Plaintiff has a patent, and, also, that he has a valid extension thereof. That he has had for a long time uninterrupted enjoyment, or what he calls public acquiescence in his claims; that he has obtained two verdicts; and a judgment in this Court upon one of them; that the Defendants have infringed his patent, and are doing irreparable injury to the Plaintiff, by building cars and selling them to the Railroad Companies; and that he has not said or done any thing, which would render it inequitable to put a sudden stop to the business of these Defendants ere he can establish his rights before a jury, and thus pave the way to annihilate all the travel on the railroads of this busy community. Such are *his* assertions, such he contends are the facts; and thereupon he demands *your Honor's intervention.*

I do not propose to spend a moment in stating elemental principles which regulate the issuing of injunctions, excepting so far as to call your mind back, for a single moment, to the reasons on which the power of granting them is founded, and to the just limits of the exercise of judicial discretion.

By the statute of 1789,—the Judiciary Act,—the power to grant *injunctions* is only where "*there is no plain, adequate and complete remedy at law.*" The Act of 1836,—the Patent Act,—authorizes injunctions *but according to the course and usages of Courts in Equity.* Not according to the course and usages of *English Courts* of Equity, *but according to the course and usages of the Courts of Equity as established by the Judiciary Act.* Now there ARE CASES of infringement in which a suit at law does not give a FULL and ADEQUATE REMEDY. As 1st, Where the Defendant is IRRESPONSIBLE; 2d, Where his business is of a fugitive character; 3d, Where he has had a trial, and being sued a second time, has discovered NO NEW DEFENCE; for the Court will not waste its time in hearing the same thing over again; and 4th, Where the *same case*, on the part of the Plaintiff, has been repeatedly sustained, and the *same defence* then set up has been repeatedly OVERTHROWN, WITHOUT COLLUSION, or the appearance of collusion, and when there has been a full and HONEST DEFENCE.

In SUCH CASES an injunction alone will protect the rights of the Complainant, because, otherwise, he might be forever compelled to litigate, and there might be no spot of ground on the face of the globe where he could rest his foot and find his title to that enclosure secured to him by the Courts of his country. BUT, an injunction is not *necessary*, nor within the true scope of the power of the Courts, where a suit at law is "*a plain, complete and adequate remedy.*" And an injunction IS NOT to be resorted to in such cases; *e. g.*, where the Defendants *are* unquestionably responsible; where their business *is* local and permanent, there being no chance of escape from responding to judgments at law; and where the Plaintiff is not engaged in any line of business in which an injunction is necessary for his protection against competition. The character of our Government requires that every man should have his common law rights, and first among them his right of trial by jury preserved to him, unless some extraordinary circumstance warrants EQUITY in interfering and withholding them. To preserve these rights was one of the great objects of the Judiciary Act. Now, the granting or withholding of injunctions, is always discretionary. It is *never compulsory*. There is no state of facts that can be proved, in which the Court is absolutely bound to yield up its judicial discretion, no *matter* what are the merits of the inventor; no matter how many verdicts have been rendered in favor of the Plaintiff against strangers; nay, even against the same parties; the injunction is still held within the Judge's hand, and it may be allowed to go forth or be held back, according to the opinion of the Court, considering all the circumstances of the case. We mean to say that there is no imperative rule upon the subject, and we need not refer to the many cases disposed of, not only in this Court, but in others. We will suggest that of Maney vs. Sizer, in the District of Massachusetts; where, after long investigation by some of the most distinguished counsel in our neighborhood, a verdict was rendered sustaining the patent right, and finding that the Defendants had infringed that right, nevertheless, the Judges who presided at that trial refused to grant an injunction, under the circumstances, against even the Defendant himself. Numerous cases, to the same point, are cited in "Orr vs. Littlefield."

I also call the attention of your Honor to the decision of this Court in this case, in Wood and Minot's Reports, cited by the learned counsel for the Complainant. And in this very cause Judge Conkling has refused to grant an injunction notwithstanding what has transpired before this Court. We are free to admit, that injunctions are usually granted in the Courts of the United States, when the Plaintiff's right is WELL ESTABLISHED in the following manner.

First. *By unimpeachable verdicts, which have been rendered* *upon a full investigation of* ALL THE FACTS *brought to the notice of the Judge, before whom the motion is pending.* With your Honor's permission, I will repeat that statement. "By unimpeachable verdicts, which have been rendered upon a full investigation of ALL THE FACTS brought to the notice of the Judge, before whom the motion is pending." That is the qualification. That is, if a verdict had been rendered upon *all the facts* that we have *now* been spreading before your Honor, we should have comparatively little ground to object to the issuing of the injunction.

Second. By LONG and EXCLUSIVE and UNDISPUTED acknowledgment, on the part of the public, of *the rights of the Plaintiff as he claims to have them construed* in this Court. Not of SOME rights. Not of SOME claims. Not of SOME patent. But of the *very* rights which he claims your Honor's sanction to uphold.

Third. Where there are NO CONSIDERATIONS brought to the attention of the Court, that would make a sudden interruption of the Defendant's business unjust and inequitable.

Fourth. When the *injury* to the Defendant's business would not be irreparable (in case the Plaintiff should, at last, fail to maintain his claims).

And lastly. Where the *injunction* would be the *only* effectual means of *securing* the Plaintiff from IRREPARABLE LOSS. *Not* where he is SURE of OBTAINING ample satisfaction for the use of his invention, in case he succeed in establishing his *claims.*

These are familiar rules, and we cite no authority to support them. At the trial before Judge Conkling, it did *not* appear that there had been any thing approaching an *undisputed possession* of the rights claimed by the Complainant,—any substantial acknowledgment on the part of the public as to the validity of those rights; nor, *any such proceedings in the shape of verdicts* as would sanction the Court in using this tremendous power of injunction; and the attention of the learned counsel for the Plaintiff was called, we presume, to that fact, in the excellent opinion of his Honor. The Plaintiff has come forward a second time to build up, somewhat higher, his airy castle, and having produced some farther evidence in regard to public acquiescence,—although the testimony that was produced on the former trial was quite insufficient to move his Honor's mind,—it is my duty to present it to the attention of this Court, to state the evidence fairly and the answers that are to be made to it.

That evidence consists of two classes of proofs. First,—LICENSES. And, second,—SUITS. I speak, first, of the Licenses, or what may be treated as some evidence of acquiescence on the part of the Railroad Companies. The first mentioned is the transaction with the Baltimore and Ohio Railroad Company; and I need say no more than that a contract was entered into between that Company and the Plaintiff, *not relating to this patent*, and having no reference to it, but merely giving that road a title to the services of Mr. Winans in any improvements that he *might have made*, or *might thereafter make*, in relation to the machinery of the road. This patent was not at that time in existence, and, as it was no part of that contract,—or rather, as nothing in particular was said about it in that contract,—we may presume that this went into the general category of all other improvements that might thereafter be made; and it could not be treated as a license appertaining to this patent, nor an admission of the validity of that claim, *which did not*, at that time, exist.

Second. The Frenchtown and Philadelphia, and Wilmington and Baltimore Roads subsequently *united* into one road. The evidence on that point proves, that a suit was brought against the York and Frenchtown road, before his honor Chief Justice Taney, some time since. The Plaintiff in that case failed to obtain a verdict. After the suit had been thus suspended, and the Jury disagreed without acknowledging the Plaintiff's rights, the small sum of $500 was paid to the Complainant, *causa pacis* and to avoid all further litigation; a sum which I trust was far less than the fees of the learned counsel who managed that cause. I know not that anything need be added to these remarks upon that subject, except to refer the Court to the testimony of Shultz and Dorsey, who both say, that they *never did use a car substantially like* the Plaintiff's upon that road. Therefore, taking this fact in connection with this quiet and peaceable adjustment of litigation for the small sum of $500, it seems to me the circumstances are far from proving a quiet enjoyment of the rights claimed by the Plaintiff, or the receiving from him any license, or employing or using under such license, cars substantially like that which he claims. I think that this Court will not look upon such adjustments as admissions of rights, and that it will not be ready to discourage peace-making by misconstruing the motives of the parties.

The third alleged license is that comprehended in a contract with the Boston and Lowell Railroad Company. But, on looking at that contract, which is annexed to the affidavit of Mr. Higginson, your Honor will find that it embraced the right to use four of Mr. Winans's patents, including this, and that the engineers of the road, and others acquainted with it,—as, for example, Mr. Higginson, Mr. Lee, Mr. Parrott, and Mr. Griggs,—all united in stating that the Boston and Lowell Railroad Company have never used a car constructed substantially like that of Mr. Winans. Mr. Higginson goes further, and says that of so little worth was that license, so far as it related to Winans's eight-wheel trucks, they would not have given any thing for the contract, if it had not embraced the other three patents, which were supposed, unhappily for them, to be of some value.

Again. The Reading Railroad Company is the last mentioned in the evidence to which my attention has been turned. And it is stated that Mr. Tucker, the President of that road, purchased of Mr. Winans the right to use his eight-wheel trucks under all the freight and passenger cars on that immense road, of ninety miles in extent, and doing a business of more millions of dollars per annum, than I dare undertake to remember. My colleague at this moment informs me that the sum annually earned is between two and three millions of dollars on freight, thus employing thousands of cars. For the paltry sum of $500 Mr. Winans sold the right to use his invention, if he had any, to that Company. Mr. Winans states in his bill, that one, whom we all know to be among the most distinguished members of the bar in the United States, I refer to Mr. Meredith, was his counsel. And it also appears in the evidence in this case, that Mr. Meredith was at the same time the counsel of the Reading Railroad Company, from which facts, together with the high character of that gentleman, both in and out of the profession, I infer that this paltry sum of $500 was rather paid as a compliment, and out of respect to Mr. Winans's counsel, than with any view of acknowledging Winans's claims, and not as a compromise. Had it been $50,000, it would be more like what Winans pretends that his patent is worth. And if your Honor will look at the grant for which $500 was given, you will see that a little *douceur* of that kind, obtained from the Company which Mr. Meredith represented, was a matter of courtesy or compliment, rather than to be considered as a formal acknowledgment of Mr. Winans's claims, be they what they may. And further, Mr. Tucker has sworn, in his affidavit, that *no such car* as Mr. Winans's either *now is*, or *has been used* upon the Reading Railroad; notwithstanding the right of the Company to use it if they pleased.

Now if the Plaintiff RELIES upon his sale of *licenses* to a few Companies, as evidence of undisputed possession, or acquiescence on the part of the public, we state in reply three things: *First*, that of alleged licenses, considering the *very small* number, (being four only with the largest construction,) compared with the universal use of what the Plaintiff claims as his invention, *the fact* of there being any licenses existing, only causes the almost universal NON ACQUIESCENCE to appear the more boldly and clearly. And *Secondly*, that these licenses were for paltry sums of money, taken *causa pacis*, WITHOUT a pretence of their being adequate to any substantive right. And, *Thirdly*, that such licenses, unless numerous, are *not* evidence of much value, and unless acquiescence is general, it has no force in a Court of Justice. A man can always obtain acquiescence on the part of his friends, and unless it is universal or approaching to universality, the evidence is but of trifling import.

I now, with your Honor's leave, approach a more important matter. The Plaintiff relies upon former trials and verdicts, and a judgment upon one of them, doubtless, as putting the validity of his claims beyond dispute. There have been three trials in the Courts of the United States, and each of them has *some* importance. First, the trial in 1838 of Winans vs. The Newcastle and Frenchtown Railroad Company, before his Honor Chief Justice Taney. I must say of that trial, although it resulted in favor of the Defendants, that having examined the minutes, and particularly the opinion, the real facts, now disclosed, were then but partially known; and they were brought forward under every disadvantage, on the part of the defence; and notwithstanding this, the Jury *did not find a verdict for the Plaintiff!* The trial was a failure: it was too near home; too near the source of information in regard to the early history of the Baltimore and Ohio Railroad; too near to make it desirable to repeat the application for an injunction, in that part of the country.

Nine years after the first effort, in 1838, which was four years from the date of the patent, what does the Plaintiff? He waits in the first instance four years, before he gets defeated, and then goes off with the paltry peace-offering of which I have spoken. What does he next? Does he go forward and press for another trial against some other party? Does he seek another forum, and there endeavor to enforce his long deserted claims? I think, that large as your Honor's experience has been in patent cases, the memory of the Court will be taxed in vain to recall a single instance, in which an inventor who did not believe his patent worthless, should wait NINE long years before making his second appeal to the Courts, and SIXTEEN years before he obtains his first verdict. What would the country infer, if the trial before Chief Justice Taney had been made known? Would it not be said that there has been an effort to sustain these pretended claims before a Chief Justice of the United States, which had utterly failed? And when the Plaintiff, after one defeat, is unheard of in the Courts for nine long years,—I ask what inference a business man would justly draw from that fact? Such a defeat would not, as the Plaintiff alleges, tend to *make* every one settle with him, and admit his asserted rights, but it would lead them to suppose that he would cease from enforcing his patent in any other quarter.

Then Winans waits until 1847, in which year we hear of the suit of Winans against the Troy and Schenectady Railroad Company, and after that has been allowed to linger by the wayside until 1850,—sixteen years after the patent was originally granted, —he then obtained a verdict for $100! and had judgment upon the verdict! And now, I ask your most careful consideration of the *true weight to be attributed to that verdict*, in the decision of the present cause. I hope your Honor will not take me to be one, who desires to diminish in the slightest degree the solemnity and importance of a verdict rendered in this Court of the United States. I do not intend to utter a syllable against the verdict, nor to ask your Honor to undervalue, to the thousandth part of a drachm, the true weight to be given to it. And I know that your Honor will take care that the weight which does not belong to it shall not be given to it, in the disposition of the cause which we have the honor to present. If it had been a verdict like those in the ordinary course of trials, no objection to be made to it, and nothing to be said of it, except that it disposed of the whole case, I should not have come here to argue this cause. But allow me to call your attention to some of its peculiarities. And, in the first place; it is not doing injustice to the shrewd management of the younger counsel of Mr. Winans, to give him the credit of saying, that this patent has been pushed forward, in these last days of its existence, with an adroitness which is worthy of a grey-headed counsellor. And the first step in such cases is, of course, to gain verdicts where they can be most easily obtained; to attack Defendants at their weak points; just as an invading army attacks another, namely, where they are most hopeful of victory, and where the least resistance is to be met with. Why did they not go to Baltimore and attack some of the Railroad Companies, which are so ably represented by the counsel for the Plaintiff? Why not go to Massachusetts? They come to the State of New York, it is true, but they select their victim. It is the Troy and Schenectady Railroad Company. I am free to say that the cause was in the hands of the ablest men that this neighborhood affords; but we say that the road itself was so situated, that it had not the means or the disposition to go into a tedious and expensive investigation of the facts of this case. That is enough. A road which, at that time, was about expiring, and which has since been sold out for a small part of its original cost,—that road was attacked while struggling for existence and scarcely able to stand alone. Another feature of the trial which deserves consideration, is, that there was an agreement between counsel at that trial that the verdict, if rendered in favor of the Plaintiff, should be only for the nominal sum of $100. The Plaintiff stating, as of course, that the object of that suit was merely to establish the right, and not to injure the Defendants. And although such agreements are not unusual, and are made in good faith, I must say that they greatly facilitate the jury in passing to a verdict in favor of the Plaintiff, and that verdicts thus obtained are entitled to less weight than if rendered by an unbiassed jury, and intended to indemnify the Plaintiff for the damages actually sustained in the alleged infringements of his rights.

It was not a ground of defence in the Troy case, that *after* the date of the Plaintiff's patent he had acquiesced in the public use of his invention without objection or claim of right. For proof, I refer to the affidavit of one of the gentlemen who was of counsel in that case, Mr. Buel.

The defence rested, mainly, upon the testimony of a few experts, who supposed that the true legal construction of the claims of the patentee was such as to embrace every description of eight-wheel car which had two swivelling trucks under it. That as Chapman, Wood, and Jervis had invented and put into public use running gear which answered this description, these prior inventions were sufficient to defeat the patent.

These experts misunderstood the nature and extent of Winans's claims, as shown by the subsequent decisions of this Court; they, therefore, misapplied and misused the testimony contained in the books and drawings produced at the trial. For although the Chapman car might not be sufficient to defeat the Plaintiff's right to a patent, for the alteration he introduced, or the improvements he made upon that car, yet it might be and was sufficient to protect the Defendants in their right to use precisely what the Chapman car embodied.

The Chapman car, therefore, should have been put in proof, not to show that Winans was not the first inventor of what he claimed, but that the Defendants had used nothing in the construction of their cars, excepting what is found in Chapman.

This mistake of the experts rendered the evidence wholly worthless at the trial of the Troy case; and it is presented at this argument for purposes wholly different from those entertained before.

We assert, thirdly, that the principles of the eight-wheel car had not then been fully and scientifically investigated and practically tested by experts who were known to the Defendants.

These cars had gone into public use, without attracting particular attention, had never been the subject of that species of discriminating analytical investigation which is necessary to distinguish the mechanical principles of one peculiarity from another in the construction, organization, or modes of operation of different structures.

Fourth. That the *Wood and Trussel Cars* were not inquired of in that case. The Defendants in the Troy and Schenectady Railroad Company—what did they know about the history of *Wood and Trussel Cars* in Baltimore in 1830 ? Not a solitary sentence was uttered upon the subject, although the pay-rolls of the Baltimore and Ohio Railroad Company spoke of their manufacture and use ; and, therefore, we know that they existed. The Defendants did not know it.

Fifth. We now offer overwhelming testimony, that if the patent be so *construed* as to cover the Defendants' cars, that the *invention* was absolutely *abandoned* before the patent was taken out. Also, the conduct of Winans towards these Defendants would amount to a *license* to them to make use of the Complainant's invention. These considerations had great weight with Judge Conkling.

Sixth. The true use of evidence as to the old *Chapman Car* was wholly *misunderstood*, not only by the experts, as already shown, but by the Court and counsel. And inasmuch as the idea of the Chapman Car was not accurately comprehended, it was said that Chapman's invention was the same as that of Winans. We now say, that the Chapman Car is the same as ours, and that Winans's *differs* from *both*. In other words we say, that what distinguishes Winans's from Chapman's, also distinguishes Winans's from the Defendants'.

Seventh. A great body of evidence, of new and different cars, the same in principle as those of the Defendants, is *now brought to the attention of this Court for the first time*. I refer to the *Tredgold Car*, the *Allen Steam Carriage*, the *Trussel Cars*, the *Wood Cars*, the *Fairlamb Patent* and the *Quincy Cars*. Now, if these cars had been known at the trial before Chief Justice Taney, and his instructions to the jury had been applied to them, where would the Newcastle and Frenchtown case have landed? If these cars had been known to the counsel for the defence in the Troy case, how would that have resulted?

No person has more profound respect than myself for every considerate decision of an enlightened judicial tribunal. But I think that there is no class of subjects on which there is more danger that the judges may be uninformed and mistaken, than in questions of patent law, in its application to particular cases. The principles of the law are plain. But there is difficulty in the application of those principles to facts. And is it surprising that errors should sometimes occur in deciding cases, which require a court to dispose of profound and disputed questions, purely scientific in their character, in addition to the questions of law? I will ask your Honor, if it be not true, that this Court decides the construction of every patent according to the language of the patent itself;—and by aid of the light of all surrounding facts and circumstances proved to exist, at the date of the invention? If the Plaintiff were supposed by the Court to be an original inventor of the first eight-wheel double truck swivelling car that had ever been organized, or, in other words, that he was the inventor of the principle of the eight-wheel car, and your Honor was not informed that any other had been made before the Plaintiff's invention, then, another eight-wheel car is constructed, which is alleged to be an infringement of the first, would not you say at once, that the Plaintiff, being the first to discover and produce any double-truck swivelling car, is entitled to the principle as embodied in that structure; and that, as the Defendant embodies that principle in one form or another, he is an infringer? But how would your Honor's construction at once be changed, if it be proved that there existed twenty or thirty eight-wheel swivelling cars of various constructions, prior to the Plaintiff's invention? You would say, that every patentee's claim shall be so construed, "*ut magis valeat quam pereat.*" You would say, that if there be any construction of the Plaintiff's claim, coëxtensive with his invention, and which may be arrived at by fair interpretation of the language used by the claimant, so as not to affect his claim to novelty, the patent would be construed in such a manner as that the Plaintiff should go unscathed, if possible. His claim should cover his own invention, and no more. If a series of trials on the same patent should arise in this Court, every successive investigation bringing new and important facts to the notice of the jury, you would be compelled to draw the claim into more narrow limits, from time to time, upon taking into consideration those facts, which would render a broader construction fatal to the patentee; and thus the construction of the same patent in different Courts, or in the same Court at different times, would seem to be irreconcilable. Such cases have already occurred in the Circuit Courts. And, therefore, while I entertain the most profound respect for former constructions by the judges, of the claims of the patentee, I say, that it is upon the facts before the Court, in each particular case, that that case is to be determined. When, therefore, a new set of facts arise, I do not presume that the Court will, necessarily, arrive at the same results as in the former case, as to the construction of the patentee's claim. It would be unjust to the Plaintiff and Defendant to insist upon drawing the same conclusion, no matter how different the premises.

And now, applying these remarks to the Troy and Schenectady case, what should have been the construction of the patent at that time, if the Court had known the existence prior to the Plaintiff's invention, of ten or twelve well-organized cars, very much like the Plaintiff's, and incorporating in their structure the general principles of the swivelling truck? How different from *that* which the Court must *now* adopt in view of all the *new prior inventions?* What injustice was done to the Defendant by their own experts, in their idea on the subject of infringement!

The next consideration in relation to this Troy case, is, that we have offered a large amount of evidence to show, that Winans was *not* the *inventor* of the arrangement of the wheels and running gear in the car *Columbus*, but Conduce Gatch *was*.

The Court will notice, that I do not say, that Winans was not the inventor of some peculiarities in the car; but what I say, is, that the running gear, the arrangement of the wheels in trucks, and their connection with the car body by a swivelling pin, was *not* first devised and first in use even on the Baltimore and Ohio Road, by Ross Winans, but this was first done at that place by Conduce Gatch.

In the Troy suits, the testimony as to the Baltimore cars on the part of the Defendants rested chiefly on Gatch; and the learned Court, in their opinion, seemed to think that it was quite incredible, that Gatch could have made the arrangement of the wheels; although he was at work on them every day of his life; that he required some authority to be given to him, in order to put his inventive faculties into legitimate action, or to place the wheels nearer together or further off, although very little alteration, if any, was made. But *now* we have some *twelve men*, surrounding and *supporting* him with a mass of testimony that I cannot suppose it probable, or even possible, that a jury could resist. We have *now* also *proved*, that the drawing attached to Mr. Winans's patent did *not* illustrate the specifications; and not only so, but it did not represent anything existing *at the date of his invention.* But it represented a car, built in 1837, and from which the drawings were taken. And I do not hesitate to say, that the ruling of his Honor Judge Conkling, in regard to the effect of that drawing, is erroneous. If my memory serves me, it was held, that that drawing had the same effect as if it had been a part of the original patent. But such is not the effect which the statute gives to a drawing that has been restored; it certainly does not give such an effect to a drawing, not restored according to the statute, and containing things which the patentee never discovered or invented. Again; it was there asserted, and very little proof, if any, was offered to the contrary, that the *smoked drawing*, on which the Plaintiff lays the *foundation of his claim*, was in fact a drawing that contained the running gear of the car Columbus, which was the only subject of controversy. And it is now, we think, clearly proved, that however much Winans might have done in planning, or furnishing plans of the various shapes of bodies, the plan of the running gear was *no part* of the *original* drawing. On this point the testimony is conflicting; but we are of opinion that any jury would decide with us. It is *now* proved that the Columbus, and the eight-wheel cars which preceded it, embodied all that the Plaintiff claims. It embodies more perhaps, and possibly it does not embody the exact details of structure, but it includes what his counsel claim as Winans's invention, as I understand them, although they now assert that the Columbus was an *experiment*, and that the experiment failed. Now it is proved, that eight-wheel cars, for different purposes, were in general use, both *before* and *after* the Plaintiff's patent. That fact was not dreamed of in the Troy case. Again; it is *now* shown, that Winans's pretended invention, taking him at his word, is impracticable and useless, in so far as he departed from what was well-known before. Then it was *supposed* that Winans was the first man who had made any description of eight-wheel car, and that his claim covered every species of swivelling apparatus that could be imagined. That was the general idea at the time of that suit; and in this mistaken idea, you find the reason why the Chapman car was made use of in the manner before-mentioned, and the idea unfortunately led to an entire misconception of the whole defence.

It is enough, in addition to what I have already said on this subject, to say that Judge Conkling refused the injunction twice, notwithstanding the verdict. And he knew well all these facts. This Court has pronounced its decisions by instalments, and Judge Conkling has twice decided these questions. I am aware, that the second time, the refusal was not absolute; and he refused the injunction, even though there was an erroneous statement in Winans's bill, and one much relied upon by the Judge, namely, that he (Winans) had published his specification in the American Railroad Journal, and thus made the claim early and extensively known to the country. Subsequent investigation has shown this statement to be incorrect.

These are all the facts which I intend to bring to your attention, to show that this suit was commenced and prosecuted under peculiar circumstances; that, except the evidence upon the Chapman car, (which we propose to discuss at the proper time,) no part of the defence now relied upon was produced or known to exist at the time when that case was tried and decided. And under these circumstances, this case stands before your Honor as favorably as though there had never been a trial. And we say further, that *this case*, and those facts now for the first time proved, *have never been passed upon* in this or in any other Court.

The third suit I have to mention is that of "Winans vs. The York and Maryland Line Railroad Company." Upon this point we shall detain you but one moment, and we beg leave to refer to the affidavit of Mr. Magraw, page 49, and more particularly to that of Mr. Robert S. Hollins, page 46, both in Defendants No. 2. Mr. Hollins states the facts under which that suit was commenced and prosecuted. There was no trial on the merits, and no investigation of the rights of either party. It was taken for granted, that Winans's patent was good, and that the cars complained of were built on Winans's plan, and reliance was placed on one great question, which has yet to be settled, namely, Whether or not the Railroad Company, which was the Defendant in that case, had used any cars, or whether such user was by another and different corporation? And that question was decided in favor of the Plaintiff, much to the astonishment of the Defendant. I do not mean to assert that it was not rightly decided, but my object is to show your Honor, that no jury has pronounced upon the questions now submitted to this Court. And the reason why the Plaintiff's pretension and the alleged infringement were not disputed, is explained by the affidavits of these gentlemen. They placed their reliance upon the fact that they had not used the cars. That case, however, has not yet been finally determined; it is pending in the Supreme Court, there having been no judgment; therefore this verdict cannot affect your Honor's mind. The use made of a verdict is, to inform the Court whether the allegations of the parties are true, or not true—whether the defences relied upon have been subjected to the examination and opinion of a jury; and of course, as that cause now stands, you cannot be thus informed. Again; and in the same case, the Plaintiffs have avoided bringing suit where he resided, and where the Company held its office; but he has caught the President of that Road on a visit to Philadelphia, and there brought the action. And yet the use of the patent right was offered by Winans to that Company for $500, which sum they refused to pay. There is, therefore, no intention to admit, and no real admission is to be inferred from that case. Notwithstanding that this trial was before Judge Conkling, he refused the injunction. That, I consider as an opinion given by this Court upon the insignificance of the case, in relation to the question of granting the injunction now prayed for. In not one of these suits was the main bulk of our testimony brought to the notice of the Courts, and only part of it was offered before Judge Conkling, at the hearing when he refused to enjoin, and we have added great strength to our defence since that refusal. And, if any thing is to be considered in the course of this trial by this Court as settled, it is this: that a motion for an injunction cannot be granted, unless the complainant makes out a much better case than when the former injunctions were refused. *This* is the *third* motion for injunction! and I think it shows the great liberality of Courts of Equity, that a third attempt to obtain an injunction is for a moment tolerated.

I have now done with the *verdicts* and the *licenses;* and with all that which the Plaintiff sets up as furnishing any evidence of acquiescence on the part of the public, or as tending to substantiate his claims by aid of any judicial proceedings.

I now propose to show that the Plaintiff ought *not* to have an injunction under the peculiar circumstances of his case, and of our position. The Plaintiff is ESTOPPED from *relief in equity* by his acquiescence in, and encouragement of, the use of the invention (if it ever was used) by the *Defendants* and by the *public.* I will not take time in reading authorities, but I beg to cite three or four, and then leave this subject. I refer to Curtis on Patents, p. 395, note 2;—Wyeth and Stone, 1 Story, 273;—Neill vs. Thompson;—Webster's Patent Cases, 275;—same case in Hindmarch, 319, 20;—Saunders vs. Smith, 3d Mylne and Craig, 711. Also see pp. 720 and 736, Greenhalgh vs. Manchester;—same book, p. 785. And I further add upon that point, that this is *true* even though such acquiescence should not go so far as to constitute an *abandonment*, in law, of the Plaintiff's rights. For *equity will not tolerate a trick*, *a fraud*, *a surprise.* Winans well knew that the Defendants were engaged in *making and vending* eight-wheel cars for years. He made *no objection;* he *gave no notice.* He *assented impliedly;* and even joined the Defendants in sending eight-wheel double truck cars, such as he now claims are in violation of his patent, to Germany. He united with my client here, (Mr. Orsamus Eaton), in sending just such cars to Germany; but he never lisped a word about any patent, nor objected to it, as in any manner infringing upon his alleged invention. Again. It is shown that Winans has been selling car wheels, out of his own establishment, to Eaton, Gilbert & Co., well knowing that these wheels were to be used in making the cars commonly built in this country, and which he here claims as violating his patent.

These three things: *uniting* with the Defendants in sending cars to Germany; *selling wheels to them* for the purpose of *being used* under those cars; and having numerous conversations with them, *without* alluding to this *subject*,—are, what any man could not help calling a *consent* on the part of the Plaintiff to what was going on. It would be a fraud by Mr. Winans to set up a claim to damages for an infringement, after such conduct as that. Again. Eight-wheel cars are known by everybody to have been in use on all the Railways in the United States. And the Plaintiff knew it, and yet made no objection to it until recently. Up to 1847, thirteen years after the date of the patent, and until one year of the end of its natural existence, nobody ever heard of a claim to such an invention. It is not until after its death and resurrection, that it assumes a menacing attitude. I will not go further than to say that I hold before me the list of names of twenty-one witnesses, who show that Winans well knew that the eight-wheel car was in universal use; that he made no objection to such use, and no claim to it; so that he must have known that such cars were no violation of his patent, or that his patent was good for nothing. And I will simply refer the Court to the name and the page where their testimony is recorded. See affidavits of

1. John Murphy,	Defendants',	No. 3,	p. 9
2. Laban B. Proctor,	“	“ 3,	8
2. Wm. Raymond Lee,	“	“ 1,	41
4. Charles Minot,	“	“ 3,	159
5. John Wilkinson,	“	“ 2,	42
6. Robert Higher,	“	“ 3,	132
7. Jeremiah Van Rensaellaer,	“	“ 4,	44
do.	“	“ 3,	136
8. Albert Bridges,	“	“ 1,	37
do.	“	“ 3,	134

9.	Charles Davenport,	Defendants',	No.	3,	p. 39
10.	D. N. Pickering,	"	"	1,	39
11.	George S. Griggs,	"	"	1,	40
12.	Timothy S. Smith,	"	"	1,	37
13.	James L. Morris,	"	"	1,	39
14.	Edward Martin,	"	"	1,	45
15.	John Stephenson,	"	"	1,	42-3
16.	Leonard R. Sargent,	"	"	1,	43-4
17.	George Law,	"	"	2,	29
18.	David Beggs,	"	"	2,	31
19.	David Mathew,	"	"	2,	32
20.	Israel Adams,	"	"	3,	138
21.	George Beach,	"	"	2,	136

Now, that is the list. There are twenty-one of them; and without turning to the evidence, I will simply say, that they comprise prominent men connected with some of the most important railroads in the Union.

Now, what is the rule of Equity and Law, with regard to acquiescence? The *rule of law* is, that where an owner stands by and sees others sell or use his property *without objection*, he *waives his right to claim it.* If a man sell my horse in my presence, and I do not object to it, I cannot afterwards set up my title as against the vendee. And the law applies with equal force to patent rights, as to any other description of property; and it appears to me with justice—because a patent right is in some sense a species of intellectual, not a tangible property; more liable to be appropriated to the use of others, without intentional wrong, than any other species of property. Ideas have no "ear mark" by which they can be traced to their owners, and therefore the greater good faith is required by all patentees, that they do not so conduct themselves as to mislead others by acquiescence in the public use of their inventions.

I next pass to the consideration of the evidence as to the notice which is said to have been given by the Plaintiff to Defendants. As to this, there are two witnesses on the part of the Complainant, who assert that a notice was given to one of the Respondents, the Plaintiff himself, and Mr. Gould who is a party in interest.

The counsel on the opposite side, say that Mr. Winans had a conversation with one of the firm of Eaton, Gilbert & Co., and that he made some remarks about his patent. And Mr. Gould asserts distinctly, that *after* the Troy suit, he gave some notice to the Defendants. These are the two gentlemen by whom alone the assertion of any notice whatever, is made. Now, Eaton, Gilbert & Co., all three of them, come into Court and ANSWER under oath, and positively and unequivocally *deny* that they received notice of any description from Winans or Gould. And, *on the contrary*, they state, that they *never received* such a notice.

I am speaking of notice asserted since the Troy suit. Here is a direct contradiction on this question. Three on one side and two on the other, and I do not wish to suppose that any one of the gentlemen intends to state that which he does not suppose to be correct. But I do suppose that Mr. Gould, having a large area to travel over, and a vast number of persons to see, might have *confounded one* of the firm of Eaton, Gilbert & Co. with *some one else.* And in regard to Mr. Winans, he may have *supposed* that he *might have* said something about his patent. Therefore, as it stands upon the affirmation of the Plaintiff, and denied by the Defendants, it is not proved. And Mr. Gould, although not a party in the suit, is a party in interest, and he ought to have been made a joint Plaintiff. It is proved by Minot that he is a party in interest. Thus we have one, speaking of a conversation,—if it ever did take place,—and another asserting that a remark was made in the presence of one of the Defendants, and both of which assertions are denied by them in toto. I will now pass to the notice which it is *alleged* has been given to the *public.* The Plaintiff *asserts* that he published his specification in the American Railroad Journal. If that be true, it would be giving those parties mostly interested in railroads a notice of his claim, and a man could not be expected to do more. But the fact is, that he did *not* give that notice, and I refer to the affidavit of Mr. Randall, and to the fact that we have given notice to produce that Journal, and it has been produced and the notice does *not* exist. Therefore it is a *mistake* of Mr. Winans, and he has been led into some error, I know not how; but, of course, no man is free from mistakes.

Then, again. It is alleged that the extension is relied upon, and that there was a publication then. All I have to say on that point is, to ask your Honor to look at the papers for yourself, and you will find that it is not so. There was no insertion in the "True Sun," in which it was ordered to be published. But it was substantially concealed, by placing it in a small ephemeral paper not *generally* circulated, and, therefore, we did not get the notice that we ought to have had. For, if it had been known here, it is not to be supposed or imagined but that there would have been an opposition to the extension. At all events, the Patent Office would have had to examine the evidence that has been submitted to your Honor. I will briefly refer to the statement of Mr. Winans, to show that he has made four mistakes, and that perhaps his memory is not so reliable now as when he was a younger man.

First. I refer to the publication in the Railroad Journal, three or four times sworn to, and erroneous in point of fact. Second. To the opposition of the extension of his patent being on behalf of the New England Roads. On this point I refer to the affidavit of Lee. Defendants, No. 3, p. 110; to the record the gentlemen produced; and to Wilkinson's affidavit, No. 3, p. 50; and your Honor will see how incorrect his statements are. Then, thirdly. To the fact, that the Boston and Providence Railroad Company are said, *by Winans*, to have given an order for building cars on his plan, which is erroneous. See affidavit of Lee. No. 3, p. 110, and also to that of George S. Griggs. No. 3, p. 110. And the last is the one in controversy, namely; the conversation in which it is alleged that Mr. Winans said that he had a patent, and intended to enforce his rights. And, therefore, I argue that as Mr. Winans is mistaken as to documentary evidence, the probability is that he is also mistaken on this point. I am not aware that any intimation was given to any body of the existence of the patent before the Troy and Schenectady suit, while the patent had been laying dormant for so many years. And hence the palpable injustice to the railroads who would be prejudiced by a sudden injunction, after being lulled into security and led into danger by the Plaintiff's own conduct, as the roads have been led to *buy and use* these trucks, under the belief that they were common property, neither Winans nor any one else appearing to claim the invention.

Then, I ask your Honor to consider another reason for refusing the injunction, whatever the merits of the Plaintiff may be. It is, that the Plaintiff's LACHES in enforcing his claims is enough to prevent the Court from enjoining the Defendants at this late day. If the Plaintiff could wait from 1834 to 1852, without an injunction, there is no more probability of any injury being done to him now, and for the next three years, than during any *one* of the past *nineteen years*, when his own conduct shows that the Plaintiff did not consider that any *irreparable* injury had been done. He is now, as he has heretofore been, a manufacturer of steam engines and machinery. He is not in the same line of business as the Defendants, and, therefore, an injunction is not wanted to prevent competition or injury to the Plaintiff's manufactory.

Furthermore. The Plaintiff has never had any *exclusive use of the patented invention*, as he now claims it. His rights have never been admitted,—except once or twice,—*causa pacis.* He never asserted and followed up the claim which his counsel now set forth. And I ask your Honor, what *irreparable* injury will be done to Mr. Winans, by refusing an injunction until his rights shall be settled on final hearing, either in this Court or in Massachusetts? In the case to which I have referred in Massachusetts, the Court have ordered that the evidence shall be in in October, and it is our intention to try it as soon as possible. But no irreparable injury will follow before the case can be decided in one Court for the whole country. Another reason for denying the injunction is, that the Plaintiff has *no claim* whatever, to cover by his *patent right*, the cars made by the Defendants. We *deny* the *validity* of the *original patent*, if such be his claim, and the legality of the extension. And we deny, also, the *alleged infringement.*

Of these subjects I shall speak at another time. But the principle of law is, that an injunction shall go out only to protect unquestionable rights. *Not* to give one party an *advantage* before the question of right is settled. On this subject I have but a further word or two to say, and I ask your Honor's most serious and deliberate attention to it. By examining the affidavits of the Defendants, and their answers, you will see that the injury *to them*, in case this injunction be granted, will be irreparable. They have a capital of over $80,000 invested in the manufacture of these eight-wheel cars. They employ a large number of workmen, who, with their families, are dependent upon them for their daily bread, and who I believe cannot be employed by them, unless in the manufacture of these articles. The Defendants themselves would be broken up in business, for they tell your Honor upon oath, that they cannot apply their capital, or their structures, or employ their hands, excepting in the pursuits to which they have been heretofore devoted. I say nothing of the painful feelings with which they are brought here as trespassers, because your Honor will be influenced by no feelings of sympathy, however well deserved. But I *will* ask you to consider the statements in their affidavit, made without flourish and in all simplicity, and you will perceive the disastrous consequences to themselves and their business.

You will also see that these gentlemen are men of property, and of undoubted responsibility and integrity. They stand at the head of the car building establishments in the country, and are able and ready and willing, instantaneously, to respond to any just claim of Mr. Winans, in dollars and cents, if they have, in fact, in any way invaded his rights. And as the case in Massachusetts is so near its approach, it seems unnecessary, for the protection of Mr. Winans, under any circumstances, to inflict such a heavy blow upon these Defendants.

An injunction is sought here, nominally, against the car builders; but this is really an attempt to get control of all the railroads in the country. And if this injunction be granted, your Honor's Court will be thronged with applications for injunctions in order to compel parties to pay what is demanded of them, whether it be *right* or *wrong*. To suspend the business of a railroad for a single month might be utter ruin to the Company, and it would better submit to the most exorbitant demands, rather than stop the business on their road. Such power cannot properly be granted to the parties interested in this speculation in the exercise of *sound discretion*, whatever be the supposed merits' of the Plaintiff's claim. To confirm these views, I will here refer your Honor to Judge Grier's opinion in the case of Oliver H. P. Parker vs. Sears et al., in which he absolutely refused an injunction, notwithstanding the Plaintiff had previously recovered repeated verdicts in different Courts of the United States; because he considered that the evil effects of an injunction would not end with the Defendants, but that they would involve other interests and other parties, and put a stop to their employment. It is an opinion filled with sound views on the subject of granting injunctions; wholly applicable to this case, and sustains the positions assumed in what has been already submitted.

In conclusion, upon this branch of the subject, we cannot but think it the greatest injustice to the Defendants suddenly to break up their business, and to throw their workmen out of employ, under the circumstances of the case.

It would be unjust to the Railroad Companies, to put a stop to their income from public travel; or subject them to the grasping cupidity of speculators in exhumed patent rights.

It would be unjust to the travelling public, whose business and pleasures would most unnecessarily be interfered with, by depriving them of the ordinary means of conveyance.

The builders of these cars, and the Companies who have invested money in their purchase, have made these investments innocently, honestly, and without intending to wrong any one. Such investments should be protected in Courts of Equity.

EXTENSION.

The Defendants deny, that the *extension of this patent is valid.*

First. Because the *Commissioner failed to order such notice* as was required by the statute, which alone gave him jurisdiction of the case.

The notice actually ordered, is found in Wilkinson's affidavit, No. 3, p. 50. The statute passed May 27, 1848, about one week before the Plaintiff's application—required sixty days notice to be given. The former statute of July 4, 1836, required only three weeks notice. The notice ordered required three weeks, *ending* sixty days before the hearing. See Wilkinson, *ut supra*. Is this order sufficient, or does the law require the Commissioner to order a notice to be published sixty days, instead of three weeks ending sixty days before the time of the hearing?

Second. The *notice which was ordered to be given was not given in fact*. See Wilkinson's affidavit, *ut supra*, for the facts.

Third. The statute regulations for the extension of a patent, must be strictly followed. The notice was, in effect, concealed from New York and Massachusetts. The evidence actually existing, as to prior inventions, was not made known at the Patent Office. See the Record, which shows that fact. All the evidence, including the Fairlamb Patent, (which we suppose was then mislaid,) was unknown to the officer who extended that patent. The extension was opposed, only upon a very limited ground, without investigation of merits or knowledge of facts; and no notice was received, by those most interested to oppose it. The ground of objection taken, was, that the chief clerk had no right to make the extension. See affidavits of Lee, and Wilkinson, p. 54, No. 3.

Fourth Query. Is this matter *discretionary*, as to *what* notice is to be given? If it be so, and the Commissioner orders a certain notice which is *not given*, has he any more power?

Suppose that only ONE paper actually published the notice, could he pronounce that *sufficient*, after having required and ordered notice to be given in eight or ten papers? Suppose *no* notice is published: Can he dispense with it? Is not the compliance with an order of notice, as necessary to give him jurisdiction, as the compliance with an order of a Court of justice? Does the granting of the EXTENSION foreclose all inquiry? Is that CONCLUSIVE? Cannot the question of jurisdiction be investigated? Supposing that no notice had been given, it is clear that the Commissioner has no right to extend the patent. It may be said, that the statute is directory; yet it is nevertheless obligatory. It may be said also, that it is no fault of the patentee, that the notice ordered by the officer is not given. Nor is it the fault of the Plaintiff in a suit at law, that the sheriff fails to serve a notice ordered by the Court,—yet the jurisdiction fails.

Again. The patent was not extended by THE COMMISSIONER, but by a CLERK, *who had no right to make the* EXTENSION. The Commissioner's authority is under statute. His duty in respect to extensions is *quasi* judicial.

Powers of this description cannot be delegated by a party to a substitute, though he be appointed by the government. Last winter an attempt was made to pass a statute remedying this defect. But it did not succeed. The effort clearly shows the feeling which was entertained by gentlemen on the subject. The question of the extension is very different from that of the ORIGINAL GRANT. The public have an *interest* and *right*, at the end of fourteen years, in the invention of the patentee. And the invention once having become public, or likely to become public, when the extension is asked for, the community have a vested right, and that is to be divested *only* by the exercise of a judicial act. The *origin and history* of the formation of the *Board*, to whom the duty of adjudging upon the extension of patents was assigned, shows the *importance* attributed to the exercise of their functions; and it is obvious that *under-clerks* were not in contemplation of Congress, as proper members of the Board. The only authority of the chief clerk to do anything is under the *Act of* 1836, section 2. See Curtis, p. 471. At the time that statute was passed, the powers of extending patents was invested in a separate independent tribunal: the Secretary of State, the Attorney of the United States, and the United States Commissioner. Their united action was necessary. The only power that the clerk had, was to do the *duties* which belonged *solely* to the *Commissioner*. The statute of 1836, which was sufficient to authorize the chief clerk to do *all* the Commissioner could *then* do, is not to be *construed* as extending to *all duties* that might thereafter be devolved upon the Commissioner. This is the nucleus of the whole argument. Powers, duties and capacities *subsequently* conferred upon the Commissioner, could not be transferred to his substitute, when those powers and capacities did not exist at the time when that substitute's authority was limited. The statute of *March* 3, 1837, section 2, provides that " copies of records certified by the Commissioner, and, in his absence, by the *chief clerk*, should be prima facie evidence," &c. That provision of the statute indicates that it was understood that whatever powers or duties were imposed upon the Commissioner, by statutes *subsequent* to 1836, were not imposed upon the *chief clerk*, or, without *special authority*, conferred upon him, even in so slight a matter as certifying copies out of the office ; and even though there were no words of restriction or limitation in the statute. I mean by that, that although the statute did not limit the power of making these copies to the Commissioner by any phraseology, yet it expressly conferred that power on the chief clerk, as well as upon the Commissioner. The argument *ab inconvenienti* on this subject is undoubtedly a strong one against us. For it would be sometimes attended with great injustice to a party, if an extension were defeated, because the chief clerk could not do any thing in the absence of the Commissioner. I admit all its force, and I think that the case ought to be provided for by statute. But that fact will not make the Court construe a statute more widely than the terms would warrant.

It has been decided, that for all duties devolving on the Commissioner alone, previously to the Act of 1836, the clerk was the Commissioner *pro hac vice*, in case of absence ; and also, that the Commissioner could take up an application for extension, *pending* before the Board, and go on and *grant it.* These two points are decided and settled by the cases cited on the other side. But neither of those authorities touch this question. And I have only to add, that as this is a matter of great moment, and as it lies at the foundation of this case, and as it is now in a situation to be decided by your Honor, in connection with your brethren at Washington, during the coming session, I will not go into the argument at large upon this question, but leave it here.

CONSTRUCTION.

If the Plaintiff's claim be so construed as to include the cars of the Defendants, then we deny the *validity* of the original patent. But in order to render the objections to such a construction of the Plaintiff's claim intelligible, it is necessary to examine into *the nature and extent of those claims.* In other words, to put some *legal construction* upon the terms used in the letters patent. The subject, therefore, of the remarks I am now proceeding to, is, *the legal construction of the Plaintiff's claims.* And that construction may be ascertained by considering three questions or points.

First. The admissions of the Patentee, as derived from an analysis of the patent itself.

Second. By examining the language of the claims and the principles of Patent law, as to what *is*, and what *is not*, patentable, or capable of being embraced within the terms used.

Third. By ascertaining the state of the art of building the running gear for eight-wheel cars at the date of the Plaintiff's *alleged* invention, so as to determine in what sense he must be construed, to have used his language of description and of claim.

First. The admissions by the Patentee in his patent, are these :—1. That he was *not* the first inventor of *any one* of the parts that compose the car.

2. Nor of any particular form, or shape, or length of car body.

3. Of no mode of draft—none being stated, and none claimed.

4. That the Plaintiff's invention is for a FREIGHT or burden car, as well as for a passenger car.

5. Not for any exclusive right to place two swivelling trucks of four wheels each, under a long bodied car.

6. No particular size of wheels is recommended, and no statement made whether the wheels revolve *with*, or *on* the axes.

7. No *particular* distance apart of the bearing points of the wheels on the rails.

8. No particular distance of flanges ; by particular, I mean exact, excepting that they must be *very* close together—"*as near as may be without touching*."

9. There is a statement of the *peculiar* theory upon which his whole philosophy rests,—of which I shall presently make an exposition.

10. No *proportions* of parts to each other given.

11. That Winans was *not* the first inventor of eight-wheel cars.

12. That bearing carriages were in *common use*,—which we

call "trucks"—and, that these would answer the Plaintiff's purpose, provided that "*the wheels were close together.*" See the Patent, p. 114, in Plaintiff's proofs, fol. 14. Nothing being claimed as new about *those* trucks, excepting the *approximation of the wheels.*

13. And, lastly, that there *were* eight-wheel swivelling double-truck cars, before his invention was made. Such are the admissions found in the patent *itself.* And I refer to Chief Justice Taney's opinion to show, that his Honor understood, precisely as I understand, these admissions of the Patentee.

What are the peculiarities of the car, as Winans would have it constructed? Let us examine them AS HE STATES THEM. They are,

1. Connecting the axles of the wheels in each truck, by a long spring, bolted to the boxes, twice as strong as those in the four-wheel cars.

2. Placing the wheels of each truck very near together, so that the two shall act, as nearly as may be, *like* a single wheel; the two trucks being at or near the end of the body.

3. Connecting the trucks with the body, by means of bolsters swivelling on a king-bolt, in the manner of a *common road wagon,* dispensing with any of the *side bearings.* And, your Honor will please notice:—And " bearing *the load on the centre* of the bolster," this is the language of the patent, "which is also the centre of each bearing carriage." See the Patent, folio 23, p. 5, Plaintiff's copy. "This arrangement", (he says,) "of the bolster, and the connection of it with the body in this peculiar way, affords *great relief* (Folios 15 and 16,) from *shocks*, occasioned by percussions of the wheels on protuberant parts of the rails, or other objects; and *from the vibrations* consequent upon the use of coned wheels, as the lateral and vertical movements of the body of the car, resulting from the above causes, are much diminished." Plaintiff's proofs, p. 114, folios 15 and 16.

He accomplishes the object of running smoothly and evenly over the road, freeing the car from vibrations, and giving great relief from shocks, by this peculiar arrangement of *resting the weight of the body upon the centre of the bolsters, without side bearings, and the weight of the centre of the bolsters upon the* *centre of the truck*; while *others* in *former times*, and *we* at the *present time*, adopt a very different plan, of which I shall hereafter speak.

Before critically examining the language of the Plaintiff's claims, let us see and understand what the Plaintiff's experts suppose that *his invention consisted in*. There are but *two* witnesses of any importance on this point. The first is W. C. Hibbard; p. 81, folio 384: and in a moment I will state the substance of his evidence. He says, that the eight-wheel car has three advantages over the four-wheel car; pp. 77-8. *Second*, that there are three essential points in the construction of the eight-wheel car; p. 79, folios 370, 371. Then he proceeds to distinguish Winans's from preceding inventions, by showing that it has three peculiarities; p. 81, folio 384, and which I will state. The *First* is, "the closeness of the wheels to avoid friction." *Second*, "to support the body on two swivelling trucks." And, *Third*, the application of the motive power to *the body*.

This is what he says *Mr. Winans's invention consisted in;* and it is quite important that the attention of the Court should be addressed, to what witnesses supposed the inventor invented; so that your Honor should see what their views are in speaking, both on the question of *novelty* and on the question of *infringement*. The other is John Elgar. P. 25, folios 106—10 of Plaintiff's proofs. He also gives his views of what the Plaintiff invented. 1st. He says, that he *thinks* the invention was a long body. 2d. Swivelling trucks at or near the end; and 3d. The wheels of the truck *closer* than would do in a four-wheel car. These are the Plaintiff's experts' ideas of what Winans *invented*. On what ground do his counsel place his claims to invention? The learned counsel who opened the argument stated, that "the complete principle of Winans's invention required 1st. 'The organization to have two four-wheel trucks;' and 2d. '*Swivelling* freely under the body, by reason of transmitting the draft by the body, and the near proximity of the wheels in the truck, and the separation of the trucks from each other.'" So, that, if all *other things* are used by the Defendants, except drawing by THE BODY, they do not infringe!!

What I consider important in this admission is, that if there were "the near proximity of the wheels, and the remote position of the trucks," and *every other* feature stated in *Winans's patent*, *excepting the draft by the body*, that the invention was worthless, and those who used it would not infringe Winans's claim. If Mr. Keller is right in his view of what Winans invented, the claim would then be for a *combination* between an eight-wheel double truck swivelling car, and some apparatus for drawing it by the body. And the counsel do claim in *reality*, (though not in terms,) a combination between some mode of drawing by the body, and an eight-wheel car, which car, he says we may use *without* infringement. Because, if we may use the car without infringing, until we take that feature of the invention, then it is clear, that what he, in reality, means to claim, is a combination between some *new* mode of draft, and an *old* eight-wheel car. After having stated this much of what the *counsel* and the *experts* consider Mr. Winans's invention, I will now come to the language of the patent itself, and see if we cannot obtain some clear and definite idea of what *that patent is for*. He says:—and I read the language of the patent—"I do NOT claim running cars on eight *wheels*, this having previously been done." Not as he says in *the manner*, or *for the purposes* herein described. But *merely*, with a view of distributing the weight carried, more evenly upon a road, *and* for objects *distinct* in CHARACTER from those which I have had in view, as *herein set forth*." The objects set forth in the patent are these.

"The OBJECT of my invention is, among other things, to make such an ADJUSTMENT of the WHEELS AND AXLES as shall cause the BODY of the car to pursue a more smooth, even, direct and safe course" than it does as cars are ordinarily built, that is, on four wheels. As stated in this manner his object is to do certain things. The statement is not exactly correct, for he has confused the structure he describes, with the end or object for which the structure is designed. But the object is clear, plain, definite and distinct. It is to make the car travel more *smoothly*, directly—(not wabbling)—and safely. And there are no *other* OBJECTS stated in his *patent*. Various *means*, however, of effecting this result are stated. Now Winans denies in his patent, that railroad cars or carriages having eight wheels, were ever before arranged with the *same object.* The object is, "to run smoothly and evenly upon the straight and curved parts of the road." That statement might be accounted for, and is accounted for, if Winans was *not* aware, that there had been any preceding double truck eight-wheel cars, and he only knew of four-wheel cars being used. For, in comparison with the four-wheel cars the remark is just; but in comparison with the eight-wheel cars, the remark is most mistaken. I ask for what objects were the eight wheels of the Allen Engines, the Trussel, the Wood, and various other cars constructed; and for what object were they made to swivel at all, unless it was to run smoothly over the inequalities of the road, and go round the curves? But, whether these cars were built with that object in the mind of the constructor or *not*, still, if they were *calculated* to OBTAIN THAT OBJECT, it is not *material.* If the arrangement or *invention* EXISTED, it is no matter what was the *object* of the inventor. One who discovers the value of a PRECEDING INVENTION, is not thereby entitled to the *exclusive* use of that invention. Besides, if the eight-wheel double truck car had been originally constructed *merely* for the purpose of equally distributing the weight on the rails; and if it was *also found* that it would *run* smoother than the four-wheel car, that discovery is not such as to entitle the discoverer to a patent. For what object, or upon what design, were the eight wheels put in *two trucks* of four wheels each, other than to turn curves, and run smoothly? Eight wheels in a common stiff frame, would distribute the weight, under certain circumstances. But these eight wheels were put in two trucks; and the two trucks were to swivel, and turn curves, and run smoothly undoubtedly.

The claim goes on to say, "Nor have the wheels," when thus increased in number, "been *so arranged* and *connected with each other*"—either by DESIGN or ACCIDENT—as to accomplish this purpose. What I claim therefore as *my invention* is, the *before*-DESCRIBED *manner of arranging and connecting the eight wheels*, SO as to accomplish the end proposed by the MEANS SET FORTH, or ANY OTHERS which are ANALOGOUS and dependent on the SAME PRINCIPLES." If Winans had simply claimed the *before described* manner of arranging and connecting the eight wheels, this would have been *intelligible* to some extent; but this is NOT

HIS CLAIM. He does not *confine* his claims to THAT MANNER, or the means set forth, but he claims ALL OTHER means, modes, or manners, (*besides* those set forth,) which are analogous, *and dependent on the same principles.* So that he claims every *mode* there *can be, of making a car run more smoothly and safely than a four-wheel car, by any arrangement and* CONNECTION OF THE WHEELS, even though NOT DESCRIBED, or *invented*, or *thought of* BY HIMSELF, where it comes within a peculiar principle or theory which he sets out. Now, as the Plaintiff does *not confine* himself in his claim to the MEANS—and the machinery set forth—and to that which is *substantially* the *same*, but to ANY mode of accomplishing THE OBJECT, by *other* means than what he has discovered, it is *too broad* a claim. It is an attempt to get a PATENT for a RESULT—not a machine—or, rather, for *every mode* of arranging the wheels by which a certain *result* may be accomplished. If Winans means to confine himself to the arrangement and connection of the parts he has particularly *described*, THERE IS NO VIOLATION PRETENDED.

As the *patent cannot be* for a RESULT; that is, the result of running smoothly and swivelling to the curves—*not* being for any of the PARTS of the MACHINE—*not being* for the *trucks* alone, or *the mode of making them; not being* for the principle of the two trucks swivelling under one body, it is obvious that it CANNOT be for *merely* the *position of the trucks*, in relation to their distance from the ends of the body, as no *change* of position developes any *new* physical mechanical principle.

The patent cannot be for the mere *distance* of the *wheels* in each *truck*, as changes of distance develop no *new* mechanical principle; and the old statute declares, "that the *change of proportion* CANNOT *be the subject of a patent.*" Any one has as good a right as Winans has, to use the old elements in the same substantial construction, with a change of proportion of distances between THEM. *Change* of PROPORTION is a property incidental to all machinery, and, as I have said, not patentable. Another reason why the Plaintiff *cannot claim* the *nearness of wheels* in each truck is, because *he says*, that the trucks *in common use would answer his purpose, provided the wheels were close together.* It is proved, that the common bearing carriages had wheels from *three to twelve* inches apart; and that is far nearer than they are now put. So that, it must be supposed that Winans meant to claim, the putting them less than three inches apart, if distance has any thing to do with his claim.

Now, if his patent be for coupling the wheels in each truck, so *that the flanges shall come close together*, and *the two trucks far apart*, without reference to the peculiar mechanism by which this is accomplished, then it is *void* for *four* reasons.

First. That would be a mere change of proportion.

Second. It would not embody the true principles of an eight-wheel car, but the departure from those principles would be a pernicious change.

Third. The true principle of the eight-wheel-car was known *before*, and is used by the Defendants now.

Fourth. This arrangement as to distance, separately considered, is *not original with Winans.*

What is Winans's theory? What is his philosophy? What is the *basis*, the *radical idea* of his invention? It is this. To bring the axles of the wheels, as near as possible, to coincide with the radial line of the curves of the road, so as to approximate to the action of a single wheel. That is his theory, so far as regards the arrangement of the wheels; and, it is highly important that it should be clearly comprehended as we proceed. I will refer to four passages of the patent, to show that this is an exact statement of his theory. The first is on p. 2, folio 6. He says: "From this consideration, when taken alone, it would appear to be best, to place the axles as near to each other as possible, thus causing them to approach more nearly to the direction of the radii of the curves, and the planes of the wheels to conform to the line of the rails." The next passage is at the end of folio 13, and at the beginning of folio 14. He there says. "For this purpose, I construct two bearing carriages, each with four wheels, which are to sustain the body of the passenger, or other car, by placing one of them at or near each end of it, in a way to be presently described. The two wheels on either side of the carriages are to be placed very near to each other, the spaces between their flanges need be no greater than is necessary to prevent their contact with each other." I will now turn your attention to p. 5, folio 21, where he says: "The end which I have in view, may nevertheless be obtained by constructing the bearing carriage in any of the modes usually practised, provided, that the fore and hind wheels of each of them be placed near together, because the closeness of the fore and hind wheels of each bearing carriage, taken in connection with the use of the two bearing carriages, coupled remotely from each other as can conveniently be done, for the support of one body, with a view to the objects, and on the principles herein set forth, is considered by me as a most important feature of my invention."

You see that he says, "*the closeness of the fore and hind wheels*" is considered a most important feature of his invention. The next passage is in folio 23, where it reads. "The two wheels on either side of one of the bearing carriages may, from their proximity, be considered as acting like a single wheel." I will now read again the passage to which I first referred on p. 2. "From this consideration, when taken alone, it would appear to be best to place the axles as near to each other as possible, thus causing them to approach more nearly to the direction of the radii of the curves, and the planes of the wheels to conform to the line of the rails." There is the beginning and introduction of the philosophy of Winans, and the idea or principle is repeated four times in different parts of the patent. And I have read them to show that this is precisely the fundamental idea of all his arrangements. So far as regards this part of his structure, the predominant notion in his mind was, that the curves could be passed more easily, and a better car made, if the axles of the trucks were only brought as close together as you could possibly make them run. The whole patent is founded, and the whole invention is moulded upon exactly that notion. Let me ask your Honor's attention to the second branch of the theory; for it embraces two parts. The second branch relates to the *connection of the two trucks with the body.* Both these theories are the subject of the Plaintiff's claim.

I will refer to a few passages in the patent, which describe the peculiarity of Winans's mode of connecting the body with the trucks. I read from folio 16, of the Patent. "Upon this first bolster, I place another of equal strength, and connect the two together by a centre pin, or bolt, passing down through them, and thus allowing them to swivel or turn upon each other, in the manner of the front bolster of a common road wagon." I will also read the sentence preceding. "This bolster must be of sufficient strength to bear a load UPON ITS CENTRE of four or five tons." Your Honor will take notice that it says "*upon its centre*," for that is important. Then again in folio 23. "The bearing of the load on THE CENTRE of the bolster, which also is the centre of each bearing carriage, likewise affords great relief," (see how much importance is attributed to this, in carrying out Winans's idea) "from the shocks occasioned by the percussion of the wheels on protuberant parts of the rails, and other objects, and from the vibrations consequent to the use of coned wheels; as the lateral and vertical movements of the body of the car resulting from the above causes are much diminished." And there is another part of his patent where he states, that he wishes to have his bolster swivel, "in the manner of a common road wagon." Now everybody knows, that there is nothing new in the swivelling of a common road wagon, nor in suspending the weight of the load upon that part of the bolster which is close to the centre-pin. Nor is it asserted by the patentee that there is any thing new in it; and yet he adopted that, as an essential and elemental part in his theory of construction.

The next paragraph to which I refer is found in folio 20. "When the bolsters of the bearing carriages are placed under the extreme ends of the body, the relief from shocks and concussions, and from lateral vibrations, is greater than it is when the bolsters are placed between the middle and the ends of the body, and"—(this is the important passage)—"this relief is not materially varied by increasing or diminishing the length of body, while the extreme ends of it continue to rest on the bolsters of the bearing carriages, the load being supposed to be equally distributed over the entire length of the body." According to his idea or theory, the length or shortness of the body made no difference, provided it was suspended at the extreme ends. Hence the injustice of claiming as Winans's plan, or as any part of his *idea*, the use of a VERY LONG body; such as is now in common use, and such as his experts and his counsel *claim* as one of the important and distinctive features of his invention.

Such then is *Winans's theory* on the two branches of his claim.

I proceed now to say a word further in regard to the legal CONSTRUCTION of his claim.

Is not *this* the true construction of the claims of Winans? Namely, *The coupling of the wheels in each truck, so that the flanges shall come very close together, and the two trucks at or near the end of the body by* MEANS PECULIAR *to him*, viz: *by long springs bolted to the tops of the boxes of the axles, and bolsters bolted across the tops of the springs; and swivelling like a common road wagon, and bearing the load on the centre of the bolsters; dispensing with side bearings?* That is the structure of the car that Mr. Winans specially described and recommended as *the best* to embody his ideas. *Id est*: making "such an adjustment of the wheels and axles" (to use his own language) as will give a new ease of motion to the car, by the peculiar uses of the SPRING TRUCK, and connecting *the truck* with the body by the *wagon bolster*, dispensing with the side-bearings and the *thorough-brace*, which side bearings, without extra springs, would give a hard motion to the car.

The *theoretical* idea was very GOOD on paper, but the *practical* trial was very *disastrous*. Yet is not this his claim? Can any man *deny*, that that, which he has specifically pointed out and recommended, is not his claim? Such was Winans's *theory*, such his OBJECTS, and such his peculiar mode of *embodying* that theory.

As this *matter of construction* is so *vital* in this case, and such extraordinary ideas have been entertained from the day when this litigation began before the Chief Justice of the United States, to the present hour, and so remarkable have been the shifting grounds upon which the patent has from time to time been put, that I propose to throw out some suggestions of argument upon the constructions that I have stated as the true construction of Mr. Winans's claim, and the only construction upon which the patent can stand consistently with any pretence that Winans was the first and original inventor of the things claimed by him. Suppose that the patent is *not confined* to the mechanical contrivances of LONG SPRINGS, bolted to the boxes of the axles, with *road wagon bolsters*, bolted across the middle of the springs, *as the means of arranging and connecting* the wheels with each other and with the body. And suppose that by the true construction of the patent, it is for *that mode* or *any other mode or mechanism*—arranged without frame or otherwise—by which the wheels could be connected closely in pairs to form bearing carriages, and the bearing carriages remotely from each other, to sustain the body. Then in that case the patent would be for the *principle* of the eight-wheel car, reduced to practice not only by the mode described, but by any other mode that will embody the same principle, *and therefore void.*

1st. Because the specific mode described and recommended is pernicious as a mode, and would require experiment to discover the error in the specification, and to develop other modes better adapted to embody that principle *not* described in the specification.

2d. It is void for want of originality, because the *true* principle oft he eight-wheel car was prior to Winans's patent, described and *used* and embodied in mechanism different from Winans's, and the same as that now in general use.

3d. That if it could be deduced, *from the Plaintiff's specification*, that he *intended to place the wheels at a distance from each other, different from what was before known and used;* such difference would *not* be the discovery of a NEW PRINCIPLE, and it is not clearly definite and distinct from previously known distances.

And, as a difference in distance is a difference in *proportion*, and an incident common to all machines, such variation of distance is *not* a matter of invention, and does not develop any new physical law or principle.

It does not introduce any new elements, and form a new combination.

It does not constitute a new machine in its substantial parts, or in its essential character.

It is not the subject of a patent. You cannot patent a principle, and you cannot claim all modes of developing a principle.

Now, as the principle of the eight-wheel car existed in Chapman, Tredgold, the Wood car, the Trussell car; in Fairlamb's patent, in the Quincy car, in the Columbus, and in all the *old cars*, Winans's patent IS VOID, if he intended to cover *the principle* of any of them, because it is *too broad.* So said Judge Conkling.

We shall presently show, that whichever construction is taken by the Court, it is equally safe for the Defendants. For under the *first construction*, we do not *infringe;* and under the second, the PATENT is VOID.

If the Plaintiff could sustain a patent for ANY MECHANISM, coupling the two wheels close together, and placing the trucks at the ends of the body, notwithstanding the prior existence of the Chapman, Tredgold, Wood, and Trussell cars, the Columbus, the Winchester, &c., and the Allen engine, then the Defendants do *not infringe*, because THEY place their wheels FURTHER APART than the Wood and Trussell cars, and the Columbus and the Winchester, &c.; and *substantially* AS far apart as Chapman, Tredgold, Quincy and Allen; and *much further apart* than the Plaintiff allows them to be placed.

Suppose the Plaintiff means to claim as his invention "the before-described manner of arranging and connecting the eight wheels so as to accomplish the end proposed, that is—to run smoothly—*by the means set forth*, OR ANY OTHERS WHICH ARE ANALOGOUS and dependent on the same principles; this patent IS VOID, because the Plaintiff claims TOO MUCH. If change of *proportions* prevents the preceding eight-wheel from being *analogous* or dependent on the same principles as Winans's, we do NOT INFRINGE.

The plaintiff must STRIKE through Chapman, Tredgold, Quincy, Allen, Wood and the Trussell cars, because Winans's is at the *minimum distance*, and the Defendant at the *maximum distance;* and the *prior* inventions are between them both. The first makes the Plaintiff's patent VOID, or else the Defendants are not infringers. In other words: Winans embodies the theory of conforming the axles to the mean radial line of the curves, while the preceding inventors *did not*, and the Defendants DO NOT.

Although Winans's theory be ever so distinct and clear, yet, if the Plaintiff could claim a Patent for *nearness* of wheels in *one truck*, it would be equal to claiming a *patent* for putting a *large* wheel in place of a *small* wheel—for your Honor will see by the models, that by putting larger wheels on the same trucks, you bring them closer together.

Again. If the Plaintiff could claim *remoteness* of *two trucks*, *lengthening* of the *body* is all that is wanted to produce that remoteness. It is a mere *change of proportion* alone, and *nothing else*. With these remarks, upon what is not—I pass again to WHAT IS the *legal construction* to be given to Mr. Winans's claim.

Taking *into view* the fact, that there were *other eight-wheel double truck* Railroad cars for *freight*, if not for passengers, existing many years before his patent, and capable of carrying passengers as well as freight; *also*, that the patent must, by law, be so construed, if possible, "*ut magis valeat quam pereat*"—that if the construction *can*, without violence to the language, it should be so made as not to render the patent VOID, as embracing that which Winans did not invent. *Also*, considering, that *while* the placing of the wheels near together in each truck, and the trucks far apart, was a mere change of proportions, and was not original with Winans, and he can have no exclusive right to use that mode of arrangement, yet he was *the first* to *couple* the *axles* with a *long spring*, and to use the wagon bolster, which nobody ever used *before* or *since* the date of his patent, Winans's claim, if he has any *valid* one, must be *confined* to *these peculiarities of mechanical structure*, leaving *others* to couple their wheels as they please; and to use the rigid rectangular wheel-frames, with one spring to each wheel, as was done of *old*. And the "*analogous modes*, dependent on the *same principles*," must be confined to any other mode of *connecting the axles* by some *elastic* material, so as to allow of the wheels separating and approaching each other as the body rises up and down.

And, as Winans *cannot* patent his THEORY, he can claim the peculiar *devices* by which he embodied that theory,—springs, &c., if they were first invented by him, as distinguished from what was known and *used* before.

Now the *other* theory, as to the *connection* of the trucks with the body, was to carry the body more *smoothly*, by *suspending* it in a *new way*, so as to give it *new freedom* of motion upon *springs*. 1st. By placing the bolsters on *long* elastic springs. 2d. By resting the *whole weight* of the body upon the *central part of the bolster*, (and not on side bearings,) the manner of a common road wagon.

This theory also required the *peculiar devices* above stated. See patent, p. 6, where it says; "The bearing of the load on the centre of the bolster, which also is the centre of each bearing carriage, likewise affords great relief from the shocks occasioned by the percussion of the wheels on protuberant parts of the rails or other objects, and from the vibrations consequent to the use of coned wheels."

Now let us look at the theory of the Plaintiff's counsel, as to construction.

They admit and assert, that the claim is not for any part of the structure, unless combined with some apparatus for drawing the car by the body. If I am right, there is an end of their claim.

Mr. Keller. Permit me. We say that the drawing by the body was the only mode by which the principle of the invention could be practically carried out.

Mr. Whiting. That is what I mean precisely. It is a vital principle; and if you do not draw by the body, you do not use that which embodies the vital principle of the Plaintiff. They also say, that it *is not for the near coupling* of the *wheels*, and the distant position of the two trucks and their connection with the body, for the *purposes stated*, UNLESS *combined with some apparatus for drawing the car by the body.*

This is the substance of their claim they say, and if their patent does not embrace that claim, they have no claim that will stand.

They do not claim the drawing by the body as the Plaintiff's invention; but their claim is to be deemed applicable only to cars which are drawn by the body, and *not* by the perch.

So that, if the patent covers cars which draw by the perch, such a construction of the car is worthless, and does not embody the principle of the Plaintiff's invention, and the use of such a car is not an infringement of the real claims of the patent, as the Plaintiff's counsel understand them. And in such a case, the patent would be void, because it would cover prior inventions.

Now, my conclusions are these:—

1st. That this admission is equivalent to an abandonment of all claim to novelty of every part, and every combination of parts of the eight-wheel car, except when *used in this way*.

2d. As this mode of drawing is not mentioned, or described, or claimed in the patent, it results from the Plaintiff's admission that we may use every thing that the patentee has described or claimed, *without* infringement of his invention; and we become infringers only when we use something *not* there described or alluded to in the remotest manner! This is the most remarkable doctrine that I have ever listened to in a patent case. And an attempt, however adroit, to smuggle into the patent that theory of construction, and those ingenious claims which are not found in the language of the specification, nor in the intentions of the patentee, and which are palpably inconsistent with both, cannot be successful.

The learned counsel are driven to the use of vague phraseology, because it is impossible, in clear language and upon settled principles of construction, to discriminate between what *Winans*,—(using the language of the specification,)—really claims as distinguishing his invention, from what was well known before, without, at the same time, so narrowing his claim as to render him unable to make out a case of infringement.

Hence, instead of using terms which are familiar to patent lawyers, instead of claiming either the specific parts, or *some combination* of the parts of the machine for transporting freight or passengers, he says his claim is *not* for the parts, nor for any combination or arrangement of parts, but for *a whole!*

A patent for an improvement on any machine, be it a car or not, must be either for some new part, or some *combination of parts*, whether new or old; and that combination may embrace all the parts or only a certain number of parts. But when, as in this case, all the parts were old, most, if not all, the combinations of these parts were old, the Plaintiff can claim only such *combination* as is *new*. He can claim nothing more or less than *some* combination. He cannot claim the CAR AS A WHOLE. Otherwise, he would cover many parts and many combinations which it is admitted he did not invent, and so his patent would be void.

The true construction is as I have before stated, and in accordance with the opinions of the learned Judges who have had the claim under judicial consideration. See Chief Justice Taney's construction, Plaintiff's book, p. 20, (at the end;) and which has been adopted by Judge Conkling and your Honor; in which he says,—"But he claims as his invention, the MANNER *of arranging* and *connecting the eight wheels*, as specified in his patent, for the end above mentioned. And also the *connection* of a railroad *carriage body with them*, adapted either to the transportation of merchandise or of passengers."

The object of the invention has been already stated; and the *means* by which it is to be attained are classified thus in the language of the patentee. 1st. *By the beforementioned desideratum of combining the advantages of the near and distant coupling of the axles; and* 2d. *By other means to be hereinafter described.*

The ONLY MEANS stated or described in any part of the patent, are as follows:—

1st. By constructing the spring bearing-carriage with the wheels very close together.

2d. By the distant coupling of the trucks, so that the body is supported at or near the ends.

3d. That the body be twice the length of the ordinary four-wheel car; but the length is stated to be immaterial.

4th. The trucks swivelling in the manner of a common road wagon.

5th. The bearing of the load on the *centre* of the bolster.

There is no part of the patent where any thing is said about the means of draft. There is nothing said or intimated as to the absolute freedom of swivelling as being necessary or desirable. The subject itself is not alluded to in any part of the patent.

On the contrary. Two facts are mentioned expressly, which are inconsistent with the pretension, that the great idea of the patent is absolute freedom of swivelling.

1st. The trucks are to be "*coupled*," as well as the axles of each bearing carriage or truck.

Then, 2d. The two trucks are to "*swivel*," in the *manner* of a "*common road wagon.*" They are not to be left to fly round "*ad libitum.*" Each truck was to act *substantiallg like* a single pair of wheels; which every one knows could not run on a road without the guidance of a perch.

3d. The patentee says, that all the advantages contemplated by him may be obtained by substituting, instead of his spring-truck, any of the ordinary bearing carriages; and those *all* drew *by* the *perch.*

There is not only absolutely nothing in the patent to sustain the idea put forth by Mr. Keller, that absolute freedom of swivelling was essential to the construction of the car as described in the patent, but the whole patent is directly in the teeth of it.

Therefore the Plaintiff's patent cannot be construed, as embracing or embodying any idea of the absolute free swivelling of the trucks; nor as applicable only to such an arrangement; nor as being distinguished from other inventions by any such criterion.

Thus far we have shown what we believe to be the legal construction of Winans's claims.

1st. By considering the admissions of the patentee, in his specification, and an analysis thereof.

2d. By a close examination of the language of the specification and claim.

3d. By judicial authority.

Now, there is left only, on the subject of construction, and to throw light upon it, a consideration of the state of the art of making the running gear of the eight-wheel cars, at the time of the alleged invention.

This is important, both to the Patentee and to the Defendants. But the statement of the evidence must be postponed till we come to the proposition, "That Winans was *not* the first inventor of the first '*double truck eight-wheel car,*'" such as is used by the Defendants.

DISCRIMINATION.

The next point to which I ask your Honor's attention is this. That the *patent is not valid, except for the peculiar devices described in the patent, because, being an improvement on what was known and in use before, the patentee is bound to discriminate* *between his own improvements, and the cars nearest like his own, viz.: the preceding eight-wheel cars.*

The questions arising upon this subject at the present trial are very different from those which have been formerly discussed. On previous occasions, the only questions which arose were simply whether the Plaintiff had, in his specification and claim, sufficiently discriminated between the eight-wheel car, described by him, and the old *four*-wheel cars, and the Courts held that the Plaintiff had done so. Now we have introduced evidence of other *eight*-wheel cars prior to the Plaintiff's, which embodied the main features of that which the Plaintiff describes. And the issue now is an entirely new one, arising upon a new state of facts. I should not have argued this question before your Honor, if this were not so. The new evidence to which I allude is, that there were sundry eight-wheel double truck swivelling cars in existence prior to the Plaintiff's patent, which had not been proved on any former trial.

Now, if the description is not sufficient to discriminate his invention from others, that description is too vague and ambiguous to come within the requirements of the patent law.

Next. If his claims do not also clearly distinguish between new and old, they are void; because the patent is too broad.

It is a *fact* that many eight-wheel cars were in use on the Baltimore and Ohio Railroad, from the fall of 1830 to October 1st, 1834, inclusive, not invented by Winans. To say nothing of the Columbus, the Wood and Trussell cars, there were the Dromedary, the Winchester, and other passenger cars; also the Quincy cars, and the Allen engine, &c.

In what particulars was Winans bound to show the *difference* between what he claims and those that we show were in use, and upon which his improvements were founded?

We say that he was bound to *discriminate* between what was *old* and what he claimed as *new*, in all the particulars in which he claimed that *his invention consisted.* What he does *not* thus discriminate is admitted to be old, or not his invention.

And what has he discriminated and recommended? It is only the *spring truck* and the *wagon bolsters.*

In this alone has he conformed to the requirements of law; and for this *alone*, therefore, is his patent valid. What difficulty was there in Winans being definite, and in discriminating between his pretended claim and others? If his body were twice the length of the ordinary four-wheel car;—(i. e. from 20 to 24 feet,)—why not tell how long other eight-wheel cars, for passengers and freight, as the Quincy and Trussell cars, &c., *had been?*

If he placed the bolsters differently from others, why not say so; and tell how far from the end of the body they must be placed in order to come within his plan?

As to the distance of the wheels in the truck, others had placed them 3½ feet apart, as he *admits*. Is that too far? If so, why not say so? In truth, others had already placed them as near as Winans did, and, therefore, he dared not specify the distance, although his counsel now claim that he did in fact introduce a substantive improvement, by diminishing the distance between the flanges.

Why not show what he meant to claim by some original drawing? None has been proved, or referred to, and the inference that we draw is, that none really existed.

The present drawings do not help the difficulty. They were not made till 1838, as preparatory to the suit of Winans vs. The Newcastle and Frenchtown Railroad Company.

The drawing before the Court, representing a car that was not built in 1837, does not in any way illustrate the specification, but embraces things *not* in the patent, and portrays modes of construction entirely the reverse of what is there described.

I shall ask your Honor's attention to numerous particulars, in which there are diversities between the drawing and the patent. And your Honor will have to settle first the question;—What will be the legal effect of a drawing, no part of the original patent, and not restored when the patent was restored, and not made until it became necessary for the purpose of founding a lawsuit; made, therefore, "*pendente lite*," and portraying a car that was not in existence until four years after the date of the patent, whereby it is attempted to grasp and comprehend things which are not in the patent; and not that only, but also to show things which are directly inconsistent with what is contained in the specification, and directly the reverse of what the patent prescribes?

(Presenting the drawing to the Court.)

This drawing represents a freight car and not a passenger car, which is the only one described in Mr. Winans's specification. The drawing represents a rigid rectangular wheel frame for the trucks. In the specification, instead of a rigid wheel frame, the axles of the wheels were connected only by a steel spring, bolted to the boxes of the axles, with a bolster bolted across to the tops of the springs. The drawing represents two springs on each side of the truck frame, the action and reaction of which may not tend to throw the axes of the wheels out of parallelism. The specification particularly recommends one spring only on each side of the truck to connect the axes of the wheels, and the action of that spring would necessarily throw the axes out of parallelism. The drawing represents the springs with the shorter leaves downwards. The specification directs exactly the reverse.

In the drawing, the bolsters on which the body rests are placed between five and six feet from the ends of the platform of the car; whereas the specification requires the same to be placed at or near or beyond the ends of the body, and in any event no farther under the body than that the wheels shall come just within the ends, and the trucks are to be coupled as remotely from each other as can conveniently be done for the support of one body. In the drawing the wheels are placed sufficiently far apart to put a brake in between them; while in the specification the wheels are directed to be as close as possible, without the flanges touching, to have them act as near as may be like a single wheel.

The drawings represent a conical pivot marked X, with sockets and side bearings, forming a solid bolster in one solid piece, with a lower bolster and pocket Y to correspond—while the specification describes a plain bolster of wood or iron, reaching across from spring to spring, united to an upper bolster by a king bolt swivelling in the manner of the front bolster of a common road wagon.

The drawing shows a mode of coupling or drawing the car by two pieces bolted across the bottom framing, and a coupling bolt with a ring to it to drop through the coupling, to draw the car from the middle of the end of the body—the specification neither describes nor intimates any mode whatever by which the cars are to be drawn. The drawing shows cast iron pockets for the ends of the springs to work in—the specification prescribes a different mode of fastening the ends of the springs, viz. :—bolting the ends of them on to the boxes of the axles. The drawing shows an arrangement of brakes suited to the swivelling trucks of the eight-wheel car—the specification does not describe nor mention any mode of arranging or using brakes.

Now, what are we to do with a drawing that comes so directly across the track of the patent ?

The patent is not to be enlarged by reference to the drawing.

The drawing does not help the Plaintiff upon these defects of discrimination. The specification must always govern the patent.

There is nothing in the drawing which shows how other preceding cars were made, so as to aid the specification in its fatal defect of non discrimination. If the Plaintiff meant to cover any thing beyond the elastic spring trucks, why should he not have said so ?

Why not discriminate between his invention and the other preceding eight-wheel cars, viz. :—

1. The Chapman.
2. The Tredgold.
3. The Allen Carriage.
4. The Quincy Cars.
5. The Wood Cars.
6. The Trussel Cars, for horses and carriages and soldiers.
7. The Columbus, the Dromedary, &c., and also the Victory, at Philadelphia ?

These all had running gear adapted to passenger cars, as well as for freight, and were the same as those now used ; (and Winans claims *freight* as well as passenger cars.)

We say that there was no patentable discrimination to be made, excepting as to the *peculiar devices* by which Winans embodied his theory, which were :—

1st. The approximate coincidence of the axles with the radii of the curves.

2d. The central bearing of the bolsters.

And finally as to discrimination. If the Columbus were invented by Winans, and the Winchester and Dromedary and other eight-wheel cars, being allowed to go into public use *before* the patent, with Winans's knowledge and *consent*, they became public property (the statute of the 3d of March, 1839, not applying to this case).

Being public property, if they did embody Winans's pretended invention, then the Plaintiff's patent is void, *by reason of abandonment.* If they did *not* embody Winans's invention, the Plaintiff was bound to discriminate between them and his own invention, or else his patent is void for want of discrimination.

His patent does *not* discriminate except in respect to *spring trucks* and *wagon bolsters ; these* are, therefore, all he can claim; and *these* the Defendants do *not* use. Your Honor sees the Defendants are safe in either alternative.

ABANDONMENT.

I now pass to another subject, on which the evidence is somewhat voluminous, but which it will not be necessary to recite to the Court.

It is this: *That if such running gear as the Defendants build, is embraced within the true meaning of the Plaintiff's patent; and if Winans were, in fact, the first and original inventor thereof, yet his letters patent are void in law, said invention having gone into public use, with his knowledge, and without objection on his part, prior to the date of his patent.*

If a man stand by, and see his own property sold by a person having no title, he loses all legal right to reclaim it from the vendee. So a patentee, allowing his invention to go into public use without objection, virtually admits the right of the public to use it. This is just. Otherwise, he might be permitted to lie by, until many innocent parties had rendered themselves liable as infringers, had invested their capital in the business, and thus put themselves in the power of the patentee, and be liable either to utter ruin, or to most exorbitant *damages.*

The act of Congress, in force before 1834, provided, that a patentee, who had allowed his invention to go into public use *at any time before* the date of his patent, thereby lost his exclusive right to his invention; and therefore the patent was void. The statute of 1839 provides, that public use of the thing patented must be for two years preceding the date of the application for a *patent*, in order to be construed as an abandonment. This last statute is not applicable to the present case. See Chief Justice Taney's opinion. The reason of the rule is, that dedication *once* made, *cannot* be *revoked.*

Now, what are the facts ? None dispute that the Columbus, the Winchester, the Comet, and three or four other eight-wheel double truck railroad passenger cars were in open and public use upon the Baltimore and Ohio Railroad, both previously to and at the time when this patent was taken out; which was in 1834. I will read the extract from the Report of Mr. Gillingham, who was the superintendent of machinery on the Baltimore and Ohio Railroad, in the eighth Annual Report of the President and Directors, to the Stockholders of that Road, made October 1st, 1834.

At page 32, vol. 2, he says:

"Four new passenger cars have been constructed during the present year, viz.

"1st. The 'Winchester,' carrying thirty-six passengers, on eight wheels.

"2d. The 'Dromedary,' a large and commodious car, on eight wheels.

"3d. The 'Comet,' a car with five bodies, carrying forty passengers, on eight wheels.

4th. The 'Patterson,' on four wheels.

"*Four of the old cars have been repaired, and placed upon eight wheels.*"

There were then these eight eight-wheel cars in use on that road at this time, which was before October, 1834.

Now, if Winans invented the "Columbus," the "Winchester," the "Dromedary," and "Comet," they being eight-wheel cars, then these were allowed to go into public use, with his consent, and by contract; and also, *necessarily*, with his knowledge and consent, the great number of Wood cars, and Trussel cars, that were built after the Columbus, together with those built before the Columbus, also these other four-wheel cars, were never pretended by any witness to have been experimental cars.

If these cars had their wheels near together and coupled far apart, the trucks being the common bearing carriages, as referred to in the patent, they embodied Winans's pretended invention substantially; and so completely, that he cannot discriminate between them and his.

Therefore Winans's pretended invention was dedicated to the public, not merely for a few months, but for nearly four years, as we have already shown.

Unless Winans clearly discriminates between what he claims, (by a fair construction of the terms of the specification,) and these preceding running gears, or, in other words, if his patent is sufficient to cover running gear such as they had, then the invention described in the patent was in public use, and the abandonment complete.

But the Plaintiff says, that although these cars were used on a Railroad, yet that use was for the purpose of EXPERIMENT only, and that such use, although continued for so long a time, is not to be construed as an abandonment of the invention. Then the question is, whether the use of so many eight-wheel cars for so long time, in such a way, can properly be considered as a use for the purposes of experiment *only*, or is it a use not merely for the purpose of experiment, but for the ordinary business of the Railroad on which they were placed!

What does it mean to experiment? The word comes from the good old Latin "*Experior*"—*to try and find out something*, and something not settled and familiar. And it is vain for the Plaintiff to say, that he was experimenting four years; because far too many cars, both for passengers and for freight, were in public use, to be considered as an experiment.

What did Winans do, that looked like experimenting?

If the Plaintiff pretends that he was experimenting, to discover a mode of drawing the car, this cannot be true; for the specification does not describe any mode of drawing as known or discovered, or as having been the subject of experiment.

The mode of drawing now used, and shewn on the restored drawing, was first suggested in 1835, by Jacob Rupp, after the specification was drawn and the patent issued.

The last car built and tried, previously to or during the making of the specification, was the "Comet," which drew by the perch, and which car the patent describes, without suggesting any mode of drawing. Moreover, experiment was not necessary to discover the mode of drawing by the body, because that mode was described in all the books long before 1830.

How does it happen that so much experiment was necessary in the enlightened city of Baltimore, to find out how to make a good car, when Dorsey could build one at once, he having seen nothing else but the alleged *failed* experiments at Baltimore?

He was at once successful, without experiment.

Their experiments marched like the apparent course of some of the comets, more with a retrograde than a progressive motion.

The "Victory" also, in Philadelphia, was successful at once, without experiment. The invention leapt from the head of its author all perfect and complete.

How many years was it necessary that the Columbus should continue to run off the track, to complete the experiment?

Still the Plaintiff insists, that the car Columbus was an experiment merely, used from July 4, 1831 to October 1, 1834—three years and a quarter—and other cars followed in 1833 and 4, two or three years after, and he asserts that he had a right, while trying these experiments, to put these cars in public use, without losing his right to a patent.

My answer to that is, that it is *not* an experiment merely because the *use* was *continued* for several years. That seven other passenger cars followed in gradual succession, not for any such purpose as to try experiments, but as the business of the road called for them. If such use of eight different cars can be made, without being held to be a *public* use, any inventor may put his machines into use, and run them year after year, and pretend it is an experiment, provided that he at last takes out a patent. That is not the true understanding and construction of the Patent Law. I admit, that a man shall have a reasonable time to try his invention; and if it be required, that he shall use it before the eyes of all mankind while perfecting it. And if a man have a patent for a wagon, he may satisfy himself by making a reasonable number of experiments with it upon the public roads; and the fact of his driving on a public road is immaterial; and if it be an experiment on a Railroad car, that it shall run upon a Railroad, for that will not constitute the abandonment of his invention. But, Sir, there is reason in all things. A man has no business to let loose upon the public his crude and incomplete notions and half-finished inventions—to permit them to go into public use, and thus become public property, and by-and-by undertake to recall that which is no longer his own, because some lucky idea has given a new value to an old invention, which was not, in its original form, worth the expense of a patent.

But the same description of trucks, which the Plaintiff claims, (excepting only the PECULIARITY OF SPRINGS) were used under a variety of cars long before the Plaintiff's invention; and the *claim* in the patent relates only to the trucks, or running gear. The *only experiments*, therefore, which can have any connection with *this patent*, must be those which related to the *running gear or trucks*, and their connection with the body.

Now there is *no evidence* of any series of experiments having been tried on this *running gear*, whereby the *results* attained and described in the patent, vary in any *substantial* particular from the result attained in the Columbus. So that whatever experiments may have been tried as to the former size, shape or length of the body; or even as to the position of the trucks, no experiments can be shewn to have been made with *special reference* to that part of the car which is the subject of the Plaintiff's claims. And therefore experiments on other parts, or for other purposes, could not be such experiments as would be an answer to our claim of abandonment.

We must not forget what is the subject of our investigation. We must not use the word "*car*" in the sense that the patentees' witnesses have given to it. The "car" means the body and the trucks, and I know that they have experimented a long time on the construction of the body; but, in regard to the running gear, they ceased to perform their experiments after the Columbus had run a short time.

Your Honor will recollect an important piece of testimony on this subject, and that is, the contract which Winans made, and on which an opinion was given by the Chief Justice.

The testimony of Mr. Thomas also shows, that the contract was in force from the time that the Columbus was put in use,.until the date of the patent, and also that there was a verbal agreement besides the written one, that *all* the inventions made by Winans should belong to the company, or be subject to their use. Now the Comet was the last car built before the issuing of the patent, and *not* the Washington cars. These were *not* built, and no experiment was tried on them before the patent was issued. Now, Sir, was the running gear on the Comet an improvement on that which had long been in public use on that road? Was it an embodiment of some new principle? No. On the contrary, so far as relates to the running parts and their connection with the body, they were precisely the same as those which had previously been in public use upon a variety of Wood and Trussell cars, and other eight-wheel cars. I am aware that it has been alleged that there were changes made as to the nearness of the wheels, but these changes, taken alone, and considered by themselves, are not deemed even by the learned counsel of the Complainant as material. And I challenge them to point out a *change in the running gear*, which they dare to say to your Honor is a change in its mechanical principles, or mode of operation, or one which is *material* and ESSENTIAL, and not formal.

If Winans made experiments *three years*, and tried to improve upon former eight-wheel double truck cars, why did he not in his patent, inform the public clearly, what was the result of his experiments?

The language of the patent covers the Columbus, and all the other cars, as well as the Wood and Trussell and Quincy cars, etc., then why did he claim that which he had found to be unsuccessful?

Experiment of three and a quarter years duration, did not develop any thing as to the running part of the Columbus. How easy would it have been to alter the running part, if any alteration was necessary, while they did alter other parts of the car. If the arrangement of the running part of the Columbus did not embody the principle which Winans claims, he was bound to discriminate between that and what he did claim; otherwise the public are left in the dark. And not having discriminated, but having finally claimed the precise arrangement used in the Columbus, after the same arrangement has been used for years, on the Wood and Trussell cars, etc., and on the Columbus itself, this fact shows conclusively that the arrangement of the wheels, and the connection of the trucks with the body, which were the only subjects of the claim, were not a matter of experiment, but were left in October, 1834, just where they were in July 4, 1831.

In the cars of the Defendants, the wheels in each truck are more distant, and the trucks farther from the ends of the bodies than in the Columbus, and the body far more resembles the Columbus than the Dromedary or the Comet, so that if the patent covers the cars of the Defendants, it must also cover the Columbus; and if the Columbus did not embody the Plaintiff's principle, then the Defendants' cars do not.

If the Plaintiff contends that his experiment was to ascertain the proper position of the truck under the body, and that the Columbus was wrong because they were placed too far from the ends of the body, we answer:

1st. That the statement is not true.

2d. That the position of the trucks in the Defendants' cars is farther from the end of the body than in the Columbus.

3d. That all the different positions of the trucks, both at and near the ends of the body, had been used before the Columbus on the Wood cars, on the Trussell cars, and on the Quincy cars. All points of support at or near the end had been used, and that embodied in the Columbus is nearer like that which is now in use than Winans's.

4th. This distance of trucks must vary according to the proportions of the body. (See Winans's contract with the Reading Railroad Company, which shows an instance where the eight-wheels must be brought close together, in order to place two swivelling trucks under one locomotive.) Allen did the same thing.

The fact of allowing these running parts to go into use on the Baltimore and Ohio Railroad, with Winans's knowledge and consent, it being under contract, is *conclusive evidence of abandonment.* I will refer your Honor to the opinion of Chief Justice Taney on this subject, and add that it is proved in this case clearly, and admitted, (what indeed was not admitted before) that there *were* double-truck swivelling timber cars in use before the Plaintiff's patent, and that they were long-bodied, if you choose so to call them. Your Honor will not forget the elaborate, the philosophical, and the admirable exposition of the principles of physics involved in that structure, which was given the day before yesterday by my learned colleague.* Applying the instructions of the Chief Justice to that subject, it seems to me that the Court must decide on this point in favor of the Defendants, unless the judgment of the Chief Justice is erroneous; and your Honor cannot fail to perceive how much stronger the evidence of *public use* of the running gear now is, than it was when that case was tried.

If the gentlemen undertake to tell us that there was something very peculiar in the structure of the Baltimore and Ohio Railroad, I answer: that the curves were no sharper than on other roads. The curves of the road on which the Quincy cars ran were the sharpest, not exceeding in some instances 150 feet radius. And on the Baltimore and Ohio Railroad there are none of less than 400 feet radius. There is no curve now used on any roads so sharp as those formed by the switches, and no better arrangement of wheels was required than that contained in the Wood and Trussell cars after they were put into successful operation.

The increase of speed required that the wheels of each truck should be put farther apart, not that they should be brought closer together.

Now Sir, what seems to us as quite conclusive on this subject of experiment is, that no such car, as Mr. Ross Winans has claimed to be peculiarly his, has ever been put into successful operation on any road in the country. On the contrary, science and experiment have shown the fallacy of his whole theory, and the uselessness of his construction. All experiment has established this fact, that what I shall call the "*Simon Pure*" Winans's Car, has undergone but one experiment, and that ended in its abandonment and destruction. I refer to the testimony of

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* William W. Hubbell, Esq. of Philadelphia.

Schryack, *Worden* and *Shultz*; and these three witnesses, uncontradicted, have stated that to be the result of all the experiments on this car of Mr. Winans.

The Columbus was altered in 1832, then having new trucks placed under her—or, as the Plaintiff's witnesses say, having the wheels brought nearer in each truck, and the trucks farther apart —she then in 1832, embodied the principles of Winans, and being *publicly used* from that date to the date of the patent, there was an abandonment of the invention. The witnesses who prove these alterations are: "Michæl Glenn, Henry Shultz, John W. Eichelberger, Edward Gillingham, Conduce Gatch and Jacob Rupp; and almost all the Plaintiff's witnesses agree to the fact that the alteration was made, but they do not fix the date at which it was done. Indeed it is useless to talk about Winans's experiments so far as concerns the running part, since, in truth, long before the Columbus, and long before Winans pretends to have begun his experiments, the Wood and Trussell cars, in 1830, had embodied all the principles of the eight-wheel-car, in a form far nearer what the Defendants use, than are described by the Plaintiff.

Finally. Whether Winans was, or was not, experimenting for four years before he took out his patent, it is not *material*, *if* he allowed the Columbus to be in public use by a Railroad Company.

I believe that I may refer your Honor to the opinion of this Court on the motion for a new trial in the Troy case. See pp. 7, 8. The judgment, as to the question of abandonment, was founded upon the state of facts *then* presented in the evidence. And there the Court say, that "there were repeated failures in the experiments tried, and the cars abandoned, before the perfection of the car described in the patent." That was the statement pressed upon Judge Conkling's mind, and it was entirely a mistake. What evidence is there that any one of *these* cars was *abandoned*, or that *these* experiments resulted in failure ?

On the contrary, it is proved that the cars were used in the ordinary business of the road,—no one knows how long; but I suppose until they were out of fashion.

These things show that the Winchester, the Dromedary and the Comet were in public use on the 1st of October, 1834, and not abandoned, and how the Court happened to be misinformed, I know not, in regard to the true state of facts on the subject of abandonment.

It was not the cars, but it was the alleged invention that was abandoned. And while these facts took place upon the Baltimore and Ohio Railroad, the use of the same double truck running gear had spread over the whole country, almost from Massachusetts to South Carolina.

The witnesses on whom we rely to prove the abandonment *before* the patent, by showing public use, with Winans's knowledge and without objection, are,

1. Philip E. Thomas. Troy case, p. 4. Answer to Int. 2.
2. Edward May.
3. Leonard Forest.
4. Conduce Gatch.
5. John Rupp.
6. Jacob Rupp.
7. John M. Eichelbergher.
8. Edward Gillingham.
9. Henry Shultz.
10. W. E. Rutter.
11. John P. Mittan.
12. The "Baltimore Patriot."
13. Winans's contract with the Baltimore and Ohio Railroad Company.

I will also refer to Chief Justice Taney's charge, and also the charge of Judge Conkling, in Defendants' No. 1, p. 46, fol. 304, on the subject of *acquiescence.*

I refer to this opinion because a question there arose, whether abandonment depended upon the *intention of the patentee,* and which may be important here.

To show that the question of abandonment *does not depend upon the intention* of the inventor, but that it does depend upon his acts or conduct, I refer to Curtis on Patents, p. 328—the note; also to the case of Shaw vs. Cooper, in 6th Peters, p. 218; and to the case in 7th Peters, pp. 292, 321—3; and to the opinion of his Honor, Judge Nelson, in McCormick's case, p. 12 of the pamphlet report.

I think that the Court will be satisfied, upon examining those authorities, that this is the doctrine of the Courts of the United States at the present moment. I, therefore, have nothing further to add upon the subject of abandonment of the alleged invention *before* the patent was taken out.

LACHES.

There is another fact of importance, viz.: That *after the patent was issued, it laid dormant, and the public were permitted to suppose and believe that Winans did not pretend to claim the ordinary eight-wheel ear.* Its use became universal, and with Winans's knowledge, and with scarcely any objection.

The Defendants' witnesses on Winans's knowledge of eight-wheel cars being in use without claim or pretence of invention after the date of the patent, are:—

1.	Laban B. Proctor,	Defendants'	No. 3,	p. 8.
2.	John Murphy,	"	" 3,	" 9.
3.	Charles Minot,	"	" 3,	" 159.
4.	Wm. Raymond Lee,	"	" 1,	" 41.
5.	George Law,	"	" 2,	" 29.
6.	David Beggs,	"	" 2,	" 31.
7.	David Matthew,	"	" 2,	" 32.
8.	Albert Bridges,	"	" 1,	" 37.
	" "	"	" 3,	" 134.
9.	Timothy L. Smith,	"	" 1,	" 37.
10.	James L. Morris,	"	" 1,	" 39.
11.	Daniel N. Pickering,	"	" 1,	" 39.
12.	Charles Davenport,	"	" 1,	39, 40.
13.	George S. Griggs,	"	" 1,	" 40.
14.	Robert Higham,	"	" 1,	" 40.
	" "	"	" 3,	" 132.

Winans himself says, that *he* knew they were in general use in his bill.

15.	John Stephenson,	Defendants'	No. 1,	p. 42–3.
16.	Leonard R. Sargent,	"	" 1,	" 43–4.

17.	Jeremiah Van Rensselaer,	Defend.	No.	1,	p.	44.
	" " "	"	"	3,	"	136.
18.	Edward Martin,	"	"	1,	"	45.
19.	Isaac Adams,	"	"	3,	"	138.
20.	George Beach,	"	"	2,	"	36.
21.	John Wilkinson,	"	"	2,	"	43.

Under these circumstances, having thus allowed the running gear (which he now claims) to go into public use before the patent, and having made such slight claims up to 1847,—nearly the whole life-time of the patent,—stronger evidence of dedication or abandonment before, and of laches after the patent, could not be offered to any Court.

The next proposition on which the defence rests, I shall state briefly, but not argue. It is, *That the patent is void, because Winans's changes from what was known before, are bad in theory and pernicious, not useful in practice.* And I do not wish your Honor to understand that I lay great stress upon this point, because an invention may be, upon the whole, pernicious, and yet, if it were not intended to be pernicious, it may have SOME utility, and that utility may be sufficient to prevent the Court from pronouncing the patent void in law. Still, I have stated the point strongly, that the Court may see the bearing of the evidence that I intend to adduce, and which has a more important bearing on another part of the case. Not to occupy your Honor's time, I will furnish a list of witnesses who prove that Winans's theory in his specification is pernicious. This will dispose of that part of my subject.

Therefore, in recapitulation on the subject of the construction of the claims of the patent, we say :—

1st. That the patent is not valid, because the patentee has not discriminated between his own alleged invention and what was well known and in public use before ; and that whether Winans did, or did *not* invent the Columbus, it is immaterial on this point.

2d. That the alleged invention,—if it be construed to embrace such cars as the Defendants use,—was in common and public use with the consent of the patentee *before*, as well as *after*, the date of his patent, and, therefore, he had no right to any patent, whether he was or was *not* the inventor; and upon this point, it is not material whether the Plaintiff was or was not the inventor of the Columbus.

3d. That the patent is void, because, so far as it introduces any changes from what was well known before, these changes were not useful in any degree, but pernicious.

NOVELTY.

The next main ground of defence is, that Ross Winans was not the first and original inventor of *that arrangement of the eight wheels, nor of that connection thereof with the body of the car*, which are used in the railroad cars built by Messrs. Eaton, Gilbert & Company.

To maintain these propositions, we shall rely:—

1st. Upon the conduct of the patentee, before and after the date of his patent.

2d. Upon the clear proof of numerous inventions of eight-wheel double truck railroad carriages, prior to the invention of the Columbus; also of many more, prior to October, 1834. We shall develop their history, their peculiarities of structure, and answer the criticisms made upon them by the Plaintiff's witnesses.

3d. That Ross Winans was *not* the inventor of the Columbus; but has attempted to impose upon the Court a fictitious, smoked drawing, in relation thereto.

4th. That Winans, in his specification, developed no new principles of mechanics, but merely borrowed all that is sensible in his philosophy from Allen, Jervis, Chapman and Tredgold.

5th. That his patent was issued immediately after the building of the "*Comet*," which was in no way,—excepting the shape of body,—different from the Columbus, and, that the "Washington Cars," which were the alleged result of his experiments, were built *after* the invention and construction of the Philadelphia car, "Victory," which was the predecessor of all the modern railroad cars.

6th. That Winans's claim has nothing to do with drawing by the body, and he had nothing to do with the invention of that mode of draft.

7. That putting other men's machines to new uses, gives Winans no right to a patent; and especially, that using old running gear to carry one kind of a load rather than another, gives the Plaintiff no right to a patent.

8th. That in order to defeat a patent, it is *not* necessary to show that prior machines existed in every respect similar to the one patented; as a change of proportions will not support a patent.

It is not expected that the Court will be able to remember 600 pages of printed testimony, therefore I shall take no time in reading it. I can only refer to and make comments upon it, requesting your Honor to verify my references at your leisure.

The *conduct of Winans* from the time of his return from Europe,—where he had been trying to sell his friction wheel,—to the 1st of October, 1834, shows plainly that he did not dare to claim any invention of the running gear of the eight-wheel car.

1st. Consider his relations to Conduce Gatch,—the inventor.

2d. While in the Reports of the Engineers and others connected with the Baltimore and Ohio Railroad Company, mention is made of every little invention which any of them laid claim to, Winans is not mentioned in any part of the reports up to the 1st of October, 1834, in any particular, as the inventor of the eight-wheel car.

3d. That the newspapers of the day, so far as they are brought to the notice of the Court, do not mention Winans in connection with this invention, though he is mentioned in connection with the friction wheel and other inventions.

4th. The running gear going into use before his eyes, in all sorts of cars, without objection or claim.

5th. The probability that Winans was one of the parties from the South, who visited the Quincy Railway. See the affidavits of Bryant and others.

6th. Winans lying by until nearly the expiration of his patent, and making but one attempt to enforce it, and that unsuccessful. I mean one attempt at law. That is enough for my purpose on that point.

I now proceed, in the second place, to call your Honor's attention to some of the more important inventions which were prior to that of Mr. Winans.

CHAPMAN CARRIAGE.

Of these the first is the "*Chapman Carriage*," *described in the Repertory of Arts.* Vol. 24, in 1814.

Chapman's carriage, as described and proved, represents both the six-wheel carriage now used, and also the eight-wheel carriage now used.

It was to be drawn by a connection with the body.

The motive power, as well as the passengers and freight, might be contained in it. And the very same thing is now being done in Boston, where they have a steam omnibus.

It was an engine and passenger carriage, such as were used in England, and called steam passenger coaches.

The trucks were left free to conform to the curves of the road; the axles were kept parallel; the bearing points of the wheels a distance apart equal to the guage of the track.

The trucks had the rigid wheel frames, consisting of the three cross-pieces, and the two side-pieces.

The middle cross-piece bore the body on a transom centre, and side bearings, with friction rollers, and was connected by king bolts with the truck.

The trucks supported the body, as all swivelling running gear always supported the body, that is, at or near the ends of the body.

It was to run on railroads, and it combined every essential principle of construction, arrangement and action, to run easily and smoothly on curves and the straight track.

It is proved the same in principle as the eight-wheel cars now in use.

That, Sir, is the *construction* of Chapman, and I have now only to add a very few words in regard to the criticisms upon it.

Criticism 1st is: That it was a *steam carriage*, and that the double truck, swivelling under a platform, bore an engine instead of freight. I answer: That the kind of load borne on the inside of the body, is quite immaterial to the arrangement and connection of the running gear; and the specification provides that this Chapman car may be driven by steam power, placed within the body, or any other kind of power, placed inside or out, horsepower or any other.

The 2d Criticism is, That the body was not quite so long as Winans's passenger or freight car.

Winans's car was from twenty to twenty-four feet long, and Chapman's car must have been about the same length, being about double the length of the ordinary car that then existed; but mere change in length *cannot* be material.

The 3d Criticism is, That the wheels were not quite so near in each truck as in Winans's patent.

We say, that they are as near as the wheels of the Defendant *between the bearing points* thereof, which is the essential distance.

In other words: the distances of the axles in Chapman is as near as the Defendant's; that is, the material distance, and not the distance of the flanges. (See Byrne, p. 12.)

That there were other cars besides those which carried the engine—called the Chapman freight cars. The Plaintiff's criticisms had no application to *those* cars—as they were merely freight cars, and were called "Chapman's cars."

These, Sir, are all the objections that have been made. I think, however, if my memory serves me, that Mr. Keller suggested that there was no mode of drawing this car by the body shewn in the book, though there *was* a mode of drawing the six-wheel car by the body thus shewn.

I think Mr. Keller said that there was no mode of drawing *described*; if he did say so, he is mistaken, as he will see by looking at the book from which the patent is taken. If he did not say so, no further answer to that objection is necessary. The Chapman book shows cars as drawn by the body, and trains also, as drawn by the body. I think that the learned Counsel made another objection, which was, that this car was made for a tram-road, which I answer by saying that the description and the specification speaks of the *edge-rail*, which is the same thing as that which we call the T rail; and which we use at this day. The wheels had a ledge or flange, which shows that it ran upon rails of the same description as we use, and whether constructed in the T shape or any other, it is no matter.

I think that one further objection was made, and which was so unfounded that it almost escaped my notice,—that the wheels revolved *on* the axles, and *not with* the axes.

In the first place, we do not admit that the fact is so. But if it be so, it is quite immaterial to the principle of the Chapman car, because the revolving of wheels *with* their axes, was a well-known mechanical equivalent for revolving the wheels *on* their axes; and this fact would not change the combination of principles upon which the double-truck swivelling car is constructed.

And we further deny, that it is the true construction of the Chapman car, so far as relates to the wheels. And, inasmuch as the invention of Chapman has been repeated by other inventors over and over again before the patent, I do not perceive how any little supposed difference of that sort can be thought to be material.

TREDGOLD CAR.

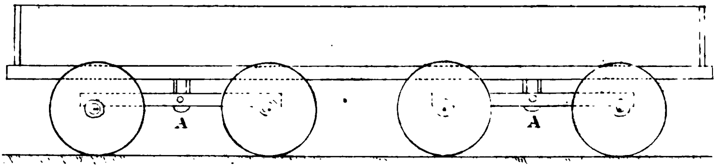
I now proceed to the consideration of the "*Tredgold Car.*"

The mode of its construction and operation having been carefully examined, as it is shewn and described in the treatise, by many distinguished scientific and practical engineers and machinists, is proved by the testimony of the following witnesses, viz:—

1.	Conduce Gatch,	page 24.
2.	Oliver Byrne,	11, 62, 3, 4, 5.
3.	John C. A. Smith,	29.
4.	Isaac Knight,	32.
5.	Edward Martin,	36.
6.	George Beach,	39.
7.	Stephen W. Worden,	40.
8.	L. R. Sargent,	41, 2.
9.	John Wilkinson,	52, 3.

TREDGOLD CAR .

Fig. 26.



10.	George Law,	54.
11.	Jacob Schryack,	73, 4.
12.	Wm. T. Ragland,	93.
13.	Henry Waterman,	97.
14.	George W. Smith,	99.
15.	Charles B. Stuart,	111.
16.	Wm. J. McAlpine,	114.
17.	Vincent Blackburne,	117.
18.	Walter McQueen,	120.
19.	George S. Griggs,	126.
20.	Albert S. Adams,	128.
21.	James H. Anderson,	131.
22.	John B. Winslow,	133.
23.	Asahel Durgan,	136, 7.
24.	John Crombie,	139.
25.	Henry W. Farley,	128.
26.	Godfrey B. King,	163.
27.	John Edgar Thompson,	166.
28.	John Murphy,	175.
29.	William Pettit,	178.
30.	Asa Whitney,	179.
31.	William C. Young,	191.
32.	William P. Parrott,	199.
33.	Charles Minot,	202.

Now, what were the objects described by Tredgold, for which his eight-wheel car was designed?

1st. To carry great weights on railroads. (See p. 94.)

2d. To carry them upon such railroads as were then built,—on roads with such curvatures, grades and inequalities as then existed.

To accomplish this object, he recommends a plan, which is precisely the same as Chapman had patented; and the same as a double Newcastle coal wagon.

What were the conditions to which it was necessary that this carriage should be made to conform?

As to the roads, the *conditions* were:

1st. They were full of short curvatures.

2d. They had switches and turnouts.

3d. They had changes of grade.

4th. They had inequalities in the rails round every curve. (See p. 135.)

5th. Also, other irregularities, occasioned by local depressions or elevations of one or the other rail, both at the joints and in the general line of the road.

6th. I will now illustrate, by the model of the track, another of those inequalities in the level of the rails, particularly mentioned in Tredgold's book.

On all parts of the road where curves are constructed, the inner rail usually continues in the same plane throughout its entire length. The outer rail rises gradually from the beginning to the centre of the curve, and then descends again to the plane of the opposite rail.

Both these rails cannot be contained in the *same plane*, and the curves they make are therefore called curves of double curvature, the same as those mentioned in Tredgold on page 135, and which I will now read.

Then how did Tredgold make his structure, so as to conform to any of these irregularities and inequalities?

1st. As he must carry a heavy load, he began with a long body.

2d. As eight wheels fastened by their axle-trees *to the frame work* without swivelling would not pass the curves or switches, he placed the *then* old fashioned four-wheel swivelling bearing carriages under each end of the body.

3d. The draft is presumed to be the same as that of every other car shown in the book: namely by the body. (See plate 1.)

Two advantages were presented by this structure besides the carrying of great loads, viz:

1st. To distribute the weight equally on *all the eight wheels.*

2d. To distribute it over a considerable EXTENT of the road as much as was useful, besides swivelling and conforming to all the inequalities and curvatures of the track.

Now let us examine as to the manner and philosophy of this distributing the weight equally on all the eight WHEELS.

This object of making the *weight* borne on each one of the eight WHEELS EQUAL, we say is accomplished, whether the two trucks are near or remote, each wheel bearing *one-eighth* of the whole load, because all the load is borne on the CENTRE of the trucks, and each truck is equi-distant from the two ends of the body. (Mr. Whiting here explained his views by aid of the models, and then proceeded.) The point which I wish to explain is, that each wheel bears an equal portion of that load. Half the body being supported by each truck, and each truck (having four wheels) swivelling in the centre, each wheel must therefore bear one quarter of what each truck bears.

We will say that the whole load shall be 800 lbs. *Each truck* will bear 400 pounds, and each wheel will bear one-fourth part of what the whole trucks bear, viz: 100 lbs., and this equal bearing o the wheels results from the introduction of the swivelling principle of the trucks.

Well, each wheel bears an equal weight, whether the body be short, so that the eight wheels *need not be* long or *equi-distant* to accomplish that object. It would not be the case, that is, each wheel would not bear an equal weight, if the eight wheels were fixed to a body, *without swivelling* at all.

Suppose you make a long rigid car body with eight wheels, each pair turning on or with an axis which is unable to swivel, being fastened to the body like the rear axles of a road wagon; suppose that with such a car you undertake to pass round a curve. How would you succeed? Could this be done in such a manner as directed by Tredgold, viz: so as that at all times, the *stress* of all the wheels upon the rails shall be EQUAL, so that one shall bear upon the rail with just as many pounds weight as the other seven wheels?

With such a structure this is impossible. For as soon as such a car enters upon the curve, the bearing point of *one* of the two forward wheels is lifted above the plane which it has ascended, so that the weight of the load may be borne principally, if not wholly, on the front and rear wheels; while the intermediate ones bear little, if any, of the weight. So also whenever in passing on an even grade, there occurs a sinking of the rail for a distance less than the distance of the bearing points of the front and rear wheels; the intermediate ones bearing little, or none of the weight: unless the body of the car gives way.

The same inequality of stress occurs when there is a mere change of grade in the rails.

Furthermore, the same difficulties would occur, excepting the last above stated, if the car should have four-wheel trucks, which could not swivel VERTICALLY, but only HORIZONTALLY by means of an axis, like that shown in the model.

In the first place you could not pass a curve, and why? Because the wheel-frames remaining fixed, prevent the least lateral swivelling whatever, and therefore you cannot get round the curves, and when you come to a switch you could not pass in or out of a depot, because a switch is sharper usually than the curves on the road.

To state the proposition abstractly. Any inequality on the rail, which would tend to lift up one wheel, or throw the axes out of the same plane, it would prevent the equal bearing of the wheels on the rails at *that time*. Therefore, to pass any inequality in the rails, and distribute the weight equally on all the wheels at all times, the trucks must swivel laterally on a king-bolt.

Now, as neither of the structures just supposed would answer *any* of the purposes proposed by Tredgold, while the trucks swivelling on a centre pin or king-bolt *would* answer all these purposes, and as swivelling trucks had been familiar to the English engineers from 1812, when Chapman took out his patent, down to 1825, when Tredgold wrote, It is incredible that so distinguished a mechanician as he was should devise and recommend a car so constructed as to be incapable of answering one of the purposes for which it was devised.

The next *object* of Tredgold is, to distribute the bearing of the load over as large a reach of the rail as might be useful, and no farther.

Now what is the rule of utility and necessity that is *laid down in Tredgold?* It is, that the body must not be so short, and the wheels in each truck must not be so near as to bring two wheels, or the crushing force of two wheels at any one time BETWEEN TWO SLEEPERS, or, on *one* SPAN of the rail.

It is quite immaterial to this question whether a rail is nine feet long or twenty feet long. It depends upon the sleepers for its support, and these are sometimes made of stone and sometimes of timber.

The rule laid down by Tredgold is the sensible rule which is now followed in the arrangement of the wheels, and which is, to put them so far apart that two wheels shall not come together at one time, with their crushing weight, on any one span of the rail. And, after you have separated the wheels in each truck to that extent, there is no use in spreading them any wider, *so far as regards the strength of the rails.* The distance to which the two trucks are separated is wholly immaterial, provided this rule above stated is observed.

It is the using of the two swivelling trucks supporting the whole load or body at two points, that makes each truck support one half the load; and each wheel in each truck supports one quarter of the burden that the whole truck bears. The distance or nearness of the trucks does not change this law.

It has been supposed, that it is a fundamental principle of the Tredgold car, to distribute the weight as equally as possible upon the rails, and this is certainly done; but this *equal distribution does not depend upon the equi-distance of the wheels.*

And it has also been supposed that this equal distribution of the weight on the wheels, and through them on the rails, was incompatible or inconsistent with having a long body, and the weight all borne by two trucks far distant from each other.

Now it has been demonstrated, that each wheel bears one eighth of the load, wherever the load is placed. The present eight-wheel cars are all so arranged as to distribute the weight on the rail precisely as stated by Tredgold, viz.: that the wheels are so far apart that two cannot rest at once on one span.

Judge Nelson. The stress of *all the wheels* on the rails, where the bearing points are, will be *equal*, no doubt.

Mr. Whiting. (Presenting to the Court a diagram.) What does Tredgold mean here, (in diagram,)—is it for distributing the weight evenly upon the RAILS?

Now let Tredgold explain his own idea. (Referring to Plate 4.) He says, "This is a diagram to show how a wagon may be made with eight wheels, so that the stress of each WHEEL upon the RAILS may be made equal." It is an equality in the stress on *each wheel* which he desires to secure. There is no statement of Tredgold in which he says that his object is to do any thing else.

Is not the stress of each wheel on the rail always equal so long as you use a truck swivelling on a king-bolt? But the moment you put on *side bearings*, it is not so; and the moment you put on a truck that does not swivel, it is not so. It is the equalizing of the stress on each WHEEL that is the GREAT IDEA of Tredgold, in order that each wheel should ALWAYS support one eighth part of the load.

Mr. Hubbell. I will read a passage where he shows that clearly. It is on p. 95 of Tredgold. "The load on EACH WHEEL must be limited to suit the strength of the rails, and the *weight* is seldom to exceed *two tons.*"

Mr. Whiting. Your Honor's desire is, to see if Tredgold's plan is *inconsistent* with the long body. Now, if it had not happened, merely as a convenient mode of drawing, that these wheels (referring to the diagram) had been placed about equidistant from each other—(which is a mere accident,) and not an essential feature in his car,—no question of this sort would have arisen.

To prove that there is nothing in Tredgold's plan inconsistent with substituting a long body instead of a shorter one, whereby the two trucks are placed farther apart and the eight wheels no longer equi-distant from each other, I point to the opinions of some forty scientific and practical men, who have carefully examined the subject, who *ought* to be competent to read and understand a treatise on machinery like Tredgold's, and who *ought* to be able to inform this Court what is and what is not consistent with Tredgold's plan, as described and shown in his work. And as these are questions not of law but of physical *science*, it is not too much to suppose that those who have devoted their lives to these subjects can understand them as well as we.

If Tredgold can be shown, by the gentlemen on the other side, or by anybody else, to say in direct language, or by fair implication, *that in order to answer the purposes for which his car is designed, it is necessary to place all the wheels equi-distant from each other along the line of the track, then I will give up the case.*

And, if they cannot find any such statement, and I can find expressions which are wholly consistent with placing the Tredgold trucks at the ends of a *long-bodied* car as well as a short-bodied car, then the length of the body is *wholly immaterial.*

We say that there is nothing in Tredgold which prescribes the distance of the wheels from one another, with one exception, and that is, that you shall not put two wheels on the same span of rail.

And there is nothing in Tredgold's book, or drawings, or in the idea or plan of his car, or in the uses to which it was intended to be put, that is in the slightest degree inconsistent with the substitution of a long instead of a short body, whereby the eight wheels would no longer be equi-distant from each other upon the rails.

I have already said that there is but one rule laid down by him as to the distance of the wheels from each other; that rule is to prevent the wheels from being, under any circumstances, too close together.

After stating, on page 29, the *length,* size and strength of the cast iron edge rail in actual use, and the proper mode of supporting the rails on sleepers of *stone or wood, solidly* embedded, and of great weight, he proceeds, on page 133, to show what is the best *length,* as well as the best shape of rails. And he says, "Now it is obvious that if ANY support be incapable of sustaining half the weight of the wagon without injury, it is insufficient for this purpose; consequently, if the supports be ever so numerous, the same degree of firmness becomes as necessary as if they were at a *great distance apart.*" See also page 132, for the best manner of *embedding* these unyielding supports or sleepers. *Each sleeper* being thus sufficient to support a greater weight than can ever be placed upon it by the stress of any *one wheel,* and the wheels being placed so far apart that only one wheel can rest at one time on any one *span of rail.*

The Court will notice that the STRESS on the RAILS, is, in all cases, equal to the stress on THE WHEELS.

To equalize the stress on each wheel will equalize the stress of the wheels on the rails, so that ONE bearing point on any part of the rails will never have more weight or stress upon it than any of the *seven* other bearing points must bear at the same time.

And the great idea of Tredgold was, that by making his double truck swivelling carriage, he should always make the number of TONS WEIGHT borne upon one of the *eight wheels*, and by that wheel upon the rail, equal to one eighth of the whole load, and thus equal to the number of tons weight on either of the other *seven* bearing points, wherever they should happen to be placed.

I will now read to the Court the following extracts from Tredgold's Treatise to prove that this is his plan, and that it is wholly without reference to the equi-distance of the wheels.

It will be remembered that in constructing passenger cars, he recommends (see page 93) the application of springs. The first passage to which I refer is in chapter 5, page 94, in Tredgold, where he says: " Small carriages must obviously be both heavier and more expensive, in proportion, than large ones. But as the *stress on a wheel* must be limited on a railroad, we cannot much enlarge the carriages without adding to the number of wheels."

On page 94, the subject of the author is eight-wheel carriages. He says: " When a carriage has more than four wheels, the body must be sustained so that its pressure may be divided equally among the wheels. In the case where eight wheels are applied to support one body, if the body rests upon the wheel-frame of each set of four wheels, in the middle of its length, (see Fig. 26, Plate 4,) and is connected with those frames so as to allow the greatest possible change of level on the rails, it is obvious that each wheel must bear an equal pressure. If one frame with its four wheels be removed, and an axis with two wheels applied in its place, the carriage would have six wheels, and it would be easy to adjust the load so that the pressure on each pair of wheels would be equal."

The next is at the end of page 94 and beginning of page 95, where it is said, " The load on *each wheel* must be limited to suit the strength of the rails; it will seldom exceed two tons *on a wheel*, nor be less than half a ton. The size of the axles may therefore vary from 2·2 inches to 3·5 inches. Perhaps the most advantageous load will be about one and a fourth tons on each *wheel*, which will require an axis of three inches in diameter."

The next is on page 179, Plate 4, Fig. 26. " A diagram to show how a wagon may be made with eight wheels, so that the stress of *each wheel* on the rails of a Railroad may be *equal*. The body of the wagon rests on the wheel-frames at A. A., and is connected to them by an axis on which the frames turn, when, from any inequality, the axes of the wheels are not in the same plane. See p. 94."

The next is on page 101. "In proportioning the body of a carriage, it should be kept in view that the load should be as low as possible, and particularly where the inclined planes are steep, for a high load in such cases produces a very unequal stress *upon the wheels*, and *consequently* upon the rails."

The next is on page 173. "For carriages on springs, and steam carriages, consider the stress on each wheel only two-thirds of the actual load upon it, which will be about an equivalent excess of strength for this case."

The next commences on page 135. "When a considèrable degree of curvature is given to a railroad, the rails of the outer curve should have a slight rise to the middle of the curve, and the rails should be stronger in a lateral direction in both lines. The object of making a slight ascent to the middle of the curve of the outer rail, is to counteract the tendency of the carriage to proceed in a straight direction, without its rubbing so forcibly against the guides as we have observed in cases where roads have had a considerable curvature."

Next on page 126. "The distance between the wheels of the carriages should be such that the *unsupported part of a rail should have to carry only one wheel.*"

Next, commencing on page 12. "In some parts near the staiths we observed malleable iron rails, in fifteen feet lengths, supported at every three feet. (See Figs. 9 and 10.) They are three and a half inches deep in the middle between the supports, and two and one-fourth inches in breadth at the upper surface; one yard in length weighs about twenty-eight pounds.

The wheels of the coal-wagons are 2 feet 11 inches in diameter, with ten spokes, and weigh 2¾ cwt.; and their axles are 3 inches in diameter, and revolve in fixed bushes."

And again on page 13. "The wheels of the engine carriage are 3 feet 2 inches diameter, with twelve spokes in each, and each weighs 3¾ cwt."

Next on page 31. "The length of each rail being 9 feet, it is supported at every three feet, and is 2¼ inches deep, and ¾ of an inch thick; the wagons carry about 35 cwt."

Next on page 43. "It often happens that a great part of the resistance at the rails arises from the lateral rubbing of the guides of the wheels; therefore it is desirable to give the wheels a tendency to keep in their path, with as little assistance from the guides as possible.

"For edge-rail carriages this may be accomplished by making the rims of the wheels slightly conical, or rather curved, as shown in Fig. 24; the carriage will then return of itself to its proper position on the rails, if it be disturbed from it by any irregularity."

Next on page 93. "Carriages for common railroads are made strong, to resist the shocks they are exposed to at every change of velocity; and it is necessary to make the parts which come in contact solid pieces, extending a little more than the length of the body of the carriage, and hooped at the extremities to prevent splitting. But carriages for passengers and for various kinds of goods must be provided with springs to reduce the force of these shocks."

Not *one word is said* in the whole book, as to there being any necessity to place the bearing points of the wheels at *equal* distances from each other along the line of the rail.

And now I will read the lines opposite to Plate 4, on page 179. "A diagram to show how a wagon may be made with eight wheels, so that the stress of each wheel on the rails of a railroad may be equal. The body of the wagon rests on the wheel frames at A A, and is connected to them by an axis on which the frames turn, when, from any inequality, the axes of the wheels are not in the same plane."

Of course the stress must be on the *rails*. Therefore, in the four or five times in which this matter is introduced, in every instance he has mentioned that it is among the WHEELS that the weight is to be divided, and not a distribution of the load at equidistant points along any given length of the rails.

It is obvious that NOTHING is gained in the way of distributing the weight along a greater or less extent of rails, provided each wheel has one span of rail to itself at all times.

And as one wheel cannot rest but on *one span* at one time, it is quite immaterial whether the spans on which the wheels respectively rest, follow each other in consecutive order; so that the first wheel stands on span No. 1, the second on span No. 2, the third on span No. 3, and the fourth on span No. 4; or whether the wheel No. 3 stands on span No. 20, and wheel No. 4 on span No. 21. Because *each span* bears one *wheel;* each wheel bears one *eighth part* of the load. And therefore it is obviously of no importance whether the wheels are equi-distant or not. Following Tredgold's rule—no position of the wheels can be imagined in which *one span* of rail can support more or *less* than one wheel, or one eighth of the load, whether these spans are consecutive or ever so far apart.

If I understand rightly, Mr. Keller contends that the Tredgold car did not have an axis or king-bolt, that would swivel laterally, but that the axis would only swivel vertically.

Mr. Keller. I said, whether Tredgold had a vertical or horizontal axis, so long as the wheels were upon axes permanently connected with the frame, and no springs were interposed, it was impossible that the wheels could bear equally upon the rails, any more than a chair with unequal legs could bear equally upon the floor.

Mr. Whiting. This remark shows that the car must have had an axis swivelling laterally; otherwise it could not conform to *the curves*, bear equally on the rail, or answer any one of the objects for which it was made; and that the connection between the car and the truck could be *permanent* in no other sense than is applicable to the ordinary connection of the truck to the body by the king-bolt. I understood another objection to be, that if this car in Tredgold had what we call a vertical axis, or pivot, it could not rise up grade. To which I simply answer, that all modern cars which have the king-bolt, do rise up grade, and go round inequalities without difficulty.

And in regard to the necessity for springs; the result of experience is, that there is no necessity of springs for that purpose; and this is shown by the Quincy cars, which carried some sixty tons up steep inclined planes without springs, and swivelled round curves, and did not require them.

Another consideration is, that as Tredgold was a man of science and not a sciolist, and as he had Chapman's book before him, with a *wheel frame*, and cars with swivelling trucks pictured as standing and swivelling on the curves of a railroad in a situation that demonstrated the impossibility of having a long body with eight wheels without swivelling, can it be possible that he could have been so stupid as to recommend such a car as the Counsel for the Plaintiff would attribute to him?

To put an end to such a pretence, I will refer to Plate 5, Vol. 24, (*Chapman's Patent,*) p. 136 of the Repertory of Arts, also pp. 130 and 139.

Is it possible, that having that work before him, that so eminent a scientific engineer as Tredgold, who received a pension from the English government for his public services, should have stultified himself so as to have made such a miserable boy's toy, as the learned Counsel on the opposite side would have your Honor understand it?

But suppose, for the sake of argument, that the design of Tredgold was to have the wheels of his carriage placed at equal distances apart, along the rail, and that he had not thought of the fact that by doubling or quadrupling the length of the body (the trucks remaining the same), the car would run more steadily on the track.

Can it be said, that any one who first put a longer body in place of a shorter one, can have a patent for such a mere alteration of form or proportions?

How absurd for the Plaintiff to set up a pretence that making the body longer or shorter introduces into Tredgold any *new prinple*, when he himself states the CONTRARY in substance. He says in his specification, page 5, fol. 20, "When the bolsters of the bearing carriages are placed under the extreme ends of the body, the relief from shocks and concussions and from lateral vibrations is greater than when the bolsters are placed between the middle and the ends of the body, and the relief is not *materially varied by increasing or diminishing* THE LENGTH *of the body*," &c.

Again. As we find in Tredgold a double truck swivelling eight-wheel car, having the *capacity*, when put to use, of accomplishing all the objects for which the Defendants construct their cars, viz., swivelling to the curves, travelling smoothly and evenly over the curves and inequalities of the roads, it is of NO CONSEQUENCE what was the OBJECT or DESIGN for which Tredgold's car was made. If the thing made, answers our purpose, that is sufficient to protect us. No other person can maintain a patent for the old car, because he has found out that it has more advantages in practical use than the original inventor knew of.

If Tredgold were now living, he could not be enjoined from using his own invention, with a longer or shorter body, because a subsequent party had discovered that it would carry its load still more easily if made of greater length. Tredgold would have had a right to his own invention and to all those CHANGES of *proportion* which were *incidental* to the use of this, as well as of all other machinery.

And I now proceed to the Quincy, Allen, Baltimore trussell and wood cars, and other inventions prior to the Plaintiff's.

But in order to do justice to our case, it is necessary, before approaching those topics, to draw the attention of the Court to some extraordinary doctrines that have been put forth by the other side.

One of the notions I refer to is, that if Winans had seen an eight-wheel car in all respects perfect, except that it drew by the truck, and that he then devised a mode of drawing it by the *body*, he would be entitled to a patent for the car as a whole.

That, Sir, is strange law, and your Honor will observe that counsel so able to present their case in its best aspects, would not have taken such a position unless they were driven to it by stress of weather.

MODE OF TRACTION.

Another of the Plaintiff's *notions* is that Winans discovered a *new idea*, viz: that drawing the car by the body, instead of by the perch, would allow the trucks absolute freedom of swivelling! In answer to that I say, that the same mode of traction by a coupling from the middle of the ends of the body was shown in Chapman's patent in 1814; in Tredgold's works in 1825; and in Strickland's in 1826.

These two modes of drawing therefore, by the perch, and by the body, in cars with swivelling trucks, were well known, and in public use before the date of the patent, though not adopted by

Winans. Also drawing by the king-bolt, which is substantially the same thing as drawing by the body, was in public use in 1833 and 1834, on the New Castle and Frenchtown Railroad, and on the Philadelphia, Wilmington and Baltimore Railroads. (See Dorsey, Defendants' No. 4, p. 77, folio 293.) We also say, that the Allen engine embodied the same idea, as the power that propelled the trucks was delivered to the trucks through the king-bolt, leaving the trucks free to swivel.

The sixteen-wheel Quincy cars had three trucks swivelling under them, and the draft was by one of the truck frames. When the cars are to be drawn singly or by horse-power, it is very doubtful which way is best. Each has its advantage. But when cars are to work in trains, drawing by the body is the most convenient. We say that, in point of fact, the mode of drawing by the middle of the end of the body, was invented and introduced first on the Baltimore and Ohio Railroad by Jacob Rupp, in February or March, 1835, after the date of Winans's patent, on the 110 freight cars, which were built by him for that road. And it was while they were building, that the idea of drawing the Washington cars, by the body, was first suggested. On this point I will refer to

1.	Rupp,	Defendants'	No. 2, p.	17.
2.	Shryack,	“	“ 3, p.	40.
3.	Gatch,	“	“ 3, p.	27.
4.	May,	“		
5.	Forest,	“	“ 2, p.	19.
6.	Shultz,	“	“ 3, p.	43.

The Car “Victory,” which was invented by George Fultz in Philadelphia, *modelled in* 1829 *or* 1830, and commenced in September of 1834, although not in operation until July 4, 1835, had a draft by the middle of the end of the body, and was 35 feet long, and square in form.

Moreover there is no description in the specification of any mode of draft, nor is there reference made in the patent to any drawing by which any mode of traction is shown.

There is no intimation, that the body of the car was to be drawn otherwise than by the perch, although both ways had been tried and were well known.

There is no claim in the patent relating or alluding to any mode of drawing.

Mr. Keller says, that it is absurd to suppose that Winans did not intend to embody this great principle of drawing by the body, when this was the great fact that gave vitality to the whole structure.

Then let me ask, why did they build the "Comet" to draw by the perch, after this wonderful discovery had been made, and had already been embodied in the Winchester, as the Plaintiff pretends it was?

Why did Winans not mention so important an idea in his patent, which is so full of ideas that are not important?

Why did he not claim it? Surely the persons who drew the claim were shrewd enough.

If there was any drawing originally sent to the Patent office, why does not Winans produce a copy of it?

Did he never have it?

What was the mode of traction of the car as shown in that drawing?

Had he no model?

Why does Winans not swear in his affidavit, that he applied, or intended to apply, that mode of drawing, if that statement is true?

We have shown that the picture of the freight car, sent in 1837 to the patent office, does not aid the specification, but is directly at variance with its directions.

If there was any grand idea which gave vitality to the whole invention, why did not any body get hold of it? Why was it not expressed by Winans himself, or by Dr. Jones, or Mr. Latrobe, his counsel?

Why was it not alluded to by some one of those who had a hand in making Winans's specification?

Since drawing by the perch had been the common way, why leave people in the dark, if any new way was to be substituted?

Why is not any allusion made in the patent to the subject of drawing *trains* of cars together, a subject so much dwelt on by the Plaintiff's counsel?

What was all the alleged experimenting for, if the result be not stated?

The perch prevented the trucks from swivelling too much or bobbing from one side to the other, when the wheels were close together. Drawing by the body became necessary and was introduced generally when the wheels of each truck were spread wider apart.

But when the rails alone were relied on, to keep the truck square, the perch being dispensed with, the wheels in each truck were placed further apart for safety.

And if the mode of drawing be essential to the principle of Winans's pretended invention, it not being stated, makes his specification defective in a vital part.

If I were to come before your Honor, expecting to maintain a patent, and if the mode of drawing was a material and substantial element in the invention, and if it had not been described or alluded to in the specification or claim, I should expect to be told that my patent could not be sustained, and that it would be absolutely necessary for me to get it re-issued. No court could sustain a suit, where such a material element was not alluded to, described or claimed.

Chief Justice Taney has decided that the mode of drawing constitutes no part of Winans's claim, whether he did or did not invent it.

Therefore, the more importance the Plaintiff attributes to this feature, the worse for him. Judge Conkling says the same thing in Plaintiff's proofs, p. 7, as follows:—"If, indeed, the infringement complained of had consisted in the use by the Defendants of this new mode of traction, the action I think could not be maintained, for I am of opinion, that according to the true construction of the specification, the Plaintiff's claim does not extend to this mode of coupling, it not being mentioned at all in the written specification, and his claim being 'the before described manner of arranging and connecting the eight wheels,' &c., he has limited himself to what he had before described; nor do I understand him now to claim any thing beyond this."

And that opinion was given, notwithstanding the Judge was under a mistaken impression as to the extent to which the drawing annexed to the Letters Patent was to be used, for he thought that it was to be taken as *part* of the original patent.

There is not even a suggestion relating to a *train* of cars in his specification, and the patent is to be treated as though only one passenger car were to be used at one time, as had been usually the case.

Who will believe that Winans had any knowledge as to the importance of drawing by the body in trains, when he is so particular as to other things, but never mentions this?

The Plaintiff's counsel has admitted that there is no infringement, if we use all other things constituting Winans's car, except drawing by the body; and it has been judicially settled that this constituted no part of the Plaintiff's invention or claim.

The car as described by the Plaintiff's patent was to draw, *not by the body, but by* the perch, and the Plaintiff says, in express terms, that "the end which I have in view may, nevertheless, be obtained by constructing the bearing carriages in any of the modes usually practised, provided that the fore and hind wheels of each of them be placed very near together." Plaintiff's proofs, p. 174, fol. 14.

The Plaintiff's counsel says that this refers to the bearing carriages on the Baltimore and Ohio Railroad; but as the specification does not describe them, none of Defendants' experts knew how they were built. But the evidence now offered at this trial shows how the bearing carriages were constructed.

They were *all drawn by the perch*, and I will refer to the following of the Plaintiff's witnesses on this point.

1.	John Elgar,	Plaintiff's proofs,	p. 27,	fol. 116.
2.	Wm. Woodville,	" "	" 32,	" 140.
3.	Michael M. Glenn,	" "	" 37,	" 165.
	" "	" "	" 38,	" 170.
	" "	" "	" 39,	" 174.
4.	Oliver Cromwell,	" "	" 46,	209,212.
5.	Thomas Walmsley,	" "	" 58,	fol. 250.
6.	John Ferry,	Plaintiff's proofs,	p. 58,	fol. 269,270—272.

All the Defendants' witnesses agree, that all the "ordinary bearing carriages" drew by the perch, and by the perch alone.

Now the Plaintiff has suggested one alteration of the ordinary bearing carriage, in order to suit it completely to the requisitions of his patent; that is, "to bring the wheels very near together;" and no other alteration being suggested, "*expressio unius, exclusio alterius.*"

To secure the alleged new idea, of the entire freedom of the swivelling of the trucks under the body, (if Winans had conceived such an idea,) his plan, described in his specification, is to bring the axles of the wheels as near together as possible, so as to resemble the action of a "single wheel," and not by the mode of drawing by the body, as the Plaintiff's counsel contend.

And to make such trucks safe or practical,—owing to their tendency to swivel too much,—it is necessary that this tendency should be controlled by a *perch.* Now, as Winans says that all the advantages claimed by him could be enjoyed by using the common bearing carriage, which drew by the perch, it amounts to the same thing as saying that none of the advantages contemplated by him, were lost or impaired by drawing the trucks by the perch.

The free swivelling of the forward truck was not intended, for it would have been dangerous.

To show the reason of this, I refer to the testimony of Godfrey B. King. Defendants', No. 3, p. 81, fol. 308—9.

Now consider the admission of counsel, that you may take every thing else in Winans's patent, if you do not draw by the body, and you do not infringe; then, clearly, you may take the *very* car described by Winans and not infringe.

The true principle of the Winans car, according to the counsel's version, is not embodied in any car that does not draw by the body.

According to the Plaintiff's testimony, the difficulty that occasioned running off the track, was not by drawing by the perch, but by having the perch too long, so that the bodies of the cars did not come together, when stopped, as they now do.

If the perch were too long, it must come in contact with the engine or other cars when the train stopped.

The idea, that connecting by the perch was more dangerous in practice than connecting by the body, is erroneous in theory and untrue in practice.

The draft, in both cases, proceeds from the same point, and is applied at the king-bolt.

On the other hand, if the carriages were united by a rear perch and a front perch, the draft would be still in accordance with the line of forward motion, because it would be nearer to the cord of the arc in which the cars were passing, instead of a tangent to that curve.

To prove, further, that the idea of drawing by the body was no part of the plan of the Plaintiff at the date of his patent, we shall show that the Comet was the last and most perfect of all the preceding cars, and that the patent describes particularly that car, and that that car drew by the *perch.* And we do so by referring to

1st. Oliver Cromwell. Troy case, p. 26. He says that "the Winchester was next to the Columbus, the next was the Dromedary. I do not recollect any other car being built while I was there. My recollection is not distinct as to the Comet." His memory grew better in 1853. He then swears, at p. 48, that "the Comet was the fourth and last car previous to the 1st of October, 1834." Fol. 220.

2d. Michael Glenn, in the Troy case, p. 28, and Plaintiff's proofs, p. 40, fol. 182. He says that "the Comet was built last."

3d. In Judge Conkling's charge, p. 11, he states the same thing.

4th. Judge Taney's charge, p. 22, he is not quite so distinct. He states that the Winchester was built in March, 1834, the Dromedary in August, 1834, and the Comet came next before Oct. 1st, 1834.

Mr. Latrobe. We admit the fact as you have stated it, as it may save time.

Mr. Whiting. The admission will save time. Now, the drawing shown by the Plaintiff, of the "Comet," corresponds with the description of the patent, particularly as to one spring, and also in various other respects; but I will simply say, no other one of the cars preceding or following it corresponded, in its peculiarities, with the descriptions of the patent.

Now, how was the Comet drawn? I shall show, by the following witnesses, that it was drawn by the perch.

In Defendants' No. 2, Jacob Rupp says, p. 16, fol. 64—5, "the Dromedary and Comet drew by the perch."

In Defendants' No. 2, Leonard Forest says, p. 19, fol. 76—7, "the Dromedary and Comet drew by the perch."

In Defendants' No. 2, Conduce Gatch says, on p. 22, fol. 87, "that the Comet drew by the perch."

These affidavits have been more than a year before the Court, and none of the Plaintiff's witnesses have sworn that the Comet, which was the last of the four, drew by the body. In fact it is not alleged.

All the Defendants' witnesses unite in this testimony, and, therefore, the Plaintiff's experiments resulted in abandoning the draft by the body,—if he ever used it,—and this accounts for his silence on the subject of draft; and there is an end of all the philosophy on that point, so much talked of by counsel in this case; so much boasted of; so elaborately displayed. It was not thought of, described, alluded to or claimed by Winans or any of his able counsel who drafted the patent; and the whole theory, that Winans discovered the great importance of drawing by the body, and covered in his patent only such cars as *do* draw by the body, is wholly *without foundation.*

Judge Nelson. It cannot be necessary, Mr. Whiting, to go further in your argument upon this point; nothing is clearer to my mind than that Winans's patent has nothing to do with the mode of drawing the cars. He has not alluded to it in any part of the specification.

Mr. Whiting. I should not have taken so much pains to overthrow the arguments of my learned opponent, if he had not rested his whole case upon the hypothesis, that drawing by the body was an essential element in the invention of Winans, and that without this the invention was worthless and the patent practically good for nothing; and if the counsel, who thus staked the whole fortunes of the case upon this assumption had not spent nearly half a day in trying to satisfy your Honor that he was right.

Judge Nelson. The argument made no impression whatever on my mind. The patent has nothing to do with the mode of drawing.

Mr. Whiting. I will then pass on to my next point.

THE WASHINGTON CAR.

It has been asserted more than once, that the Plaintiff's patent was founded upon improvements which were not developed until the building of the *Washington Cars*, so called. That until these were built, all preceding cars were merely a series of unsatisfactory experiments; that when these cars were planned and built, the experiments completed, and the philosophy developed, the specification was drawn up, and was intended to embody the principles of *those cars* as contra-distinguished from all that had preceded them.

Now we aver that these assertions are *totally untrue.*

The Washington cars were not planned before the date of Winans's application for his patent, and they cannot, therefore, be considered as a result arrived at before that application.

I have also shown that the patentee described, and intended to describe, the peculiar organization embodied in the "Comet."

To prove that the Washington cars were *not* planned before the specification was drawn up, the Plaintiff relies on these witnesses:

1st. Philip E. Thomas, p. 17, Plaintiff's proofs, fol. 68—9, who says; "that when the 'Washington cars' were about to be built, the plan of said cars was made a subject of much consideration and discussion, and the passenger cars for the said Washington Branch were directed to be built on the plan the Plaintiff recommended, *and which is the plan of those* AT PRESENT IN USE *on said road;* so far as this affirmant understands and believes, that the Washington Branch was completed in 1835, and that the consideration and discussion above referred to, must have taken place some time previous, though this affirmant is not now able to give the exact date of it."

Mr. Thomas, therefore, does not fix the date as having been before September or October, 1834.

2d. George Brown, pages 21, 22; Plaintiff's proofs, folio 87 and 91 says, that at the meeting of the board of directors, which was held on the first day of September, 1834, the superintendent of transportation having charge of the carriages and moveable machinery on the road, suggested to the board of directors the expediency of providing the carriages and the locomotives to be used on the Washington Railroad. That the President in consequence of the said suggestion, was authorized *to submit a plan* of carriages of the most approved form for consideration.

Again he says at folio 89, "that the said car or carriage invented *and patented* by the Plaintiff was recommended and adopted by the board of directors." But he does not say, at what meeting, "and which was *afterwards* built," not *before* or at the time, and "put upon said road for use." If the car thus recommended *had been patented*, it is clear that the car could not have been *any other* than what was described *in the patent*, and the recommendation could not have been made until after the patent came into existence, viz. Oct. 1, 1834.

3d. John Elgar, Plaintiff's proofs, p. 25, folio 108. He says, "and that this improved car" (namely, the one described in Winans's specification) "was first brought into general use at the opening of the Baltimore and Ohio Railroad, on the 1st July, 1835," and not on, or before October, 1834.

4th. Michæl M. Glenn, on p. 41, folio 185. Plaintiff's proof says, "that several of said cars were completed and ready for use in the latter part of the year 1834. That there were ten of the said Washington cars built before the said road was opened on the 1st July, 1835."

He does not state that any were begun before the date of the patent.

At p. 42, folio 192, he says, "that he has been familiar with the Washington cars, so called, since the year 1835, in the fall of said year."

He does not fix the time in the fall, but it is certain that it was after the first of October, the date of the Plaintiff's patent.

5th. Oliver Cromwell, Defendants' proofs, p. 49, fol. 223—224, does not fix the time at all.

6th. George Maxwell, p. 62—63, does not fix the time except in 1833—4.

Thus far not one of the Plaintiff's witnesses asserts, that these Washington cars were planned previous to October 1, 1834, the time when the patent was issued.

6th. Mr. Latrobe himself fixes the time when the drawing of the Washington cars was first shown him by Winans; which was after the 7th of February, 1835. (See Troy case Plaintiff's proofs, p. 26, ans. to Int. 7.)

These are all the Plaintiff's witnesses. The Defendant's witnesses on this point are:

1st. Jacob Shryack, Defendants' No. 3, fol. 156, says, "We commenced to build the Washington cars in the early part of November, 1834, as soon as the benches and shop at Charles street were prepared for the hands to work on them." He also states, "I am the foreman of the building of passenger cars of the Baltimore and Ohio Railroad Co." Again he says, "on the 28th October, 1834" (which was after the date of Plaintiff's patent) I went into the employment of the Baltimore and Ohio Railroad Co., and have been in their employ ever since." So that the cars could not have been begun before the 1st October 1834.

2d. Henry Shultz, Defendants' No. 4, p. 43, fol. 156, says that he is the "railroad car builder for the Baltimore and Ohio Railroad Co." He says further, "that the Washington cars were finished in 1835, to draw by the body, and that the idea in so doing was taken from the 110 freight cars made by Rupp and himself," fol. 165.

The car Victory (which was commenced in Philadelphia in September, 1834, and which came before anything was said or done about the Washington cars,) drew by the body.

No *plan was produced* for the Washington cars, because the Plaintiff's witnesses say, that the Railroad Co. adopted Winans's plan *as described in his patent.*

If any *plan* had been produced, why was not that plan inserted in the restored patent of 1837 ?

The Washington cars were in use in Baltimore in 1837, but the Plaintiff did not send to the Patent office a drawing of *any of them*, but substituted a *freight* car, to illustrate his description of a passenger car.

This fact, in connection with what was said yesterday, is conclusive that the idea of drawing cars by the middle of the end of the body did not exist in Winans's mind as a desirable arrangement, at the date of his patent.

Another proof that at the date of the patent, and even in 1837, when the drawing of the aforesaid freight car was sent to the Patent office, showing that Winans did not consider the mode of drawing as any part of his system, is the fact that he did not allude to it *on* the drawing, by lettering or describing it, as he did other parts upon the drawing which he did deem important. If he had done so, he could not have enlarged his patent.

To add still further confirmation to the proof, that the "Comet" was the foundation of the patent and that it was the only *result* of Winans's experiments, and that the Washington cars were not a result to which he had arrived before the specification was made, I recall the facts:

1st. That the "Comet" *was being built* in August, 1834, the "Dromedary" having previously been put on the road in August, the same month.

2d. *When* was the specification made? The invention of Winans's must have been completed before the specification was drawn.

The specification was drawn by Winans himself and by Dr. Jones, after which it was submitted to Mr. Latrobe.

Mr. Latrobe, in the Troy case, p. 24, Cross Int. 1, and at p. 26, Cross Int. 8, says, "that the specification was *on hand in his office* a long time; from six months to a year." He could not fix the time.

The patent was issued actually in October, 1834. The specification must therefore have been drawn six or twelve months before, that is, as early as April, 1834, if not as early as October, 1833, and having embodied what Winans then knew, and being the same specification now constituting a part of his patent; it follows that Winans could have embodied in that specification only such results as he had arrived at, at the time he wrote; and as it was written many months before any new style cars were planned or ever thought of, it is absurd to pretend that the Washington cars were the LAST in a series of experiments, which were never successful until these cars were produced.

No experiment could have been tried on cars that did not exist at the date of the patent.

No experiment could have been tried on cars, which were not planned by any person till between six and twelve months after the whole invention of Winans, as now shown in his patent, had been DESCRIBED and shown in his own hand writing in the specification.

Therefore in conclusion; the Plaintiff's patent was founded on such discoveries as he had made and embodied when the Comet was built.

It did not embrace the improvement of drawing by the body, subsequently introduced in 1835, into the Washington cars.

And if the validity of the patent is to depend on the Plaintiff's alleged discovery of the great importance of the mode of drawing, the fact is, that he had not made it, and he did not and does not claim it, but he expressly says in the patent, that which is inconsistent with such a pretence.

These directions in the patent, which are inconsistent with the absolute swivelling of trucks as derived from the drawing by the body are:

1st. That the bearing carriages must have the wheels very close together, so as to resemble the action of a single wheel (which makes them liable to wabble and turn round the track) and are to swivel under the bolster, in the *manner* of a common *road wagon.*

2d. The two trucks—after the wheels in each are coupled together by a spring—are also not merely placed under the body, or at or beyond the ends, but are "*coupled together.*" This is the language of the patent. The reason for it is, to prevent too great turning on the track, of the hind truck.

3d. All the advantages that Winans claims, he says may be derived by using, instead of the spring-trucks, any of the ordinary bearing carriages, if the wheels were near together, and all of which bearing carriages drew by *the perch* alone.

So that the Plaintiff had not planned the Washington cars, when he had completed his alleged experiments, and was not aware of any advantage to be derived by drawing the cars by the body.

These cars were *not the result* of any experiments arrived at before the specification was drawn. They are *not* the cars *described*, or intended to be described in the specification, and Winans had *not* in his mind the *idea* or plan of allowing the trucks entire freedom of swivelling, by arranging the draft through the body. But his plan *was* to have the draft through the perch, as in the Comet, which, as I have shown, was the last car begun or built before the *patent;* and *while* the specification was being prepared.

PUTTING AN OLD MACHINE TO A NEW USE.

Another question, arising out of a consideration of the history of prior inventions is—how far a change in the use or application of the running gear of a car for freight, to a car for passengers, or to a locomotive, would justify a patent?

Indeed, it is well settled, that putting an old machine to an entirely new use, gives *no* right to a patent; and much less does putting it to an analogous use, *e. g.*, converting the running apparatus under a steam engine, or freight car, or passenger car, from one of these uses to the other.

The cases in point are:

Winans vs. The Boston and Providence Railroad Company, 2 Story's Rep. 412, in which the patent friction-bearings, which the Plaintiff claimed, had been applied to other carriages, but not to railroads.

In this case the Court held, that applying an old invention to a new use was not patentable.

Bean vs. Smallwood, 2 Story, 411.

In which the patent was for making the seat and stool of a chair in two parts, so that while the stool remains stationary, the seat is made to rock, &c., and enabling it to remain fixed in any angle, &c.

A similar apparatus had been applied, not to chairs, but to other machines, and the patent was held to be void.

"If this be so," says Judge Story, "then the invention is not new, but at most an old invention, or apparatus, or machinery, applied to a new purpose. Now I take it to be clear, that a machine, or apparatus, or other mechanical contrivance, in order to give the party a claim to a patent therefor, must in itself be substantially new. If it is old, and well known, and applied only to a new purpose, that does not make it patentable. A coffee-mill, applied for the first time to grind oats, or corn, or mustard, would not give a title to a patent for the machine. A cotton gin, applied without alteration, to clean hemp, would not give a title to a patent for the gin as new.

"A loom to weave cotton yarn, would not, if unaltered, become a patentable machine as a new invention, by first applying it to weave woollen yarn. A steam-engine, if ordinarily applied to turn a grist-mill, would not entitle a party to a patent to it, if it were first applied by him to turn the main wheel of a cotton factory. In short, *the machine must be new, not merely the purpose to which it is applied.* A purpose is not patentable, but the machine only, if new, by which it is to be accomplished. In other words, the thing itself which is patented must be new, and not the mere application of it to a new purpose or object."

No patent can be obtained for turning an old machine to a new use.

The *Jacquard power-loom*, for weaving figured silks, &c., could not be patented, because applied, without alteration, to weaving three-ply figured carpets.

A stocking machine would not be patentable, merely because applied to knitting seamless bags.

Blanchard's machine for turning gun-stocks would not be the subject of a patent, by reason of its being applied to turning lasts.

Neither would Goodyear's patent for vulcanized India rubber garments, if applied without any change of ingredients or of processes, to make car-springs, combs, or walking-sticks.

Nor the galvanic battery; because applied to the purpose of covering over a surface with silver or gold; or to the still more beautiful process of electrotyping.

Nor the electric telegraph, because applied to the new and admirable astronomical clocks, so as to obtain the difference of longitude between two places.

Nor watch-work, because applied to a sub-marine torpedo, to cause it to explode at a given time.

Nor a percussion lock of a pocket pistol, because applied to a large pistol, gun or cannon.

Nor any kind of axles formerly applied to common road wagons, because applied to railroad cars, or vice versa.

Nor whatever machinery has already been applied to railroad cars, by making it run faster, or carry one species of burden rather than another.

Winans himself knew that it made *no difference* whether his double truck was put under a locomotive or a passenger car, as he sold the right to use it under locomotives to John Tucker, for the Philadelphia and Reading Railroad, in November, 1845.

See Tucker's affidavit, Defendants' No. 3, p. 88.

AS TO CHANGE OF PROPORTION.

In machinery, in order to defeat a patent, it is not necessary to show that prior machines existed, in every respect similar to the one patented, as a change of former proportions will not support a patent.

See Woodcock vs. Parker, 1 Gall. Rep. p. 438–440.

Whittemore vs. Cutter, ib., p. 480.

It has even been held, that *putting an old machine* to a *new use*, when the patentee has done this, in connection with the *original discovery of some new quality of matter*, so that he makes a new and useful result, is not patentable.

See *Tatham et al.* vs. *LeRoy*, in the last volume of Howard.

"A fortiori," the lengthening out of the body of the Chapman or Tredgold car, to be used for precisely the same purposes on the same description of railroad, is not patentable: for that amounts only to putting an old machine (with a slight change of proportions) to an old use.

How can it be, that we can use a certain machine of a certain length, with trucks under it, suited to the road, and yet that we cannot use the same machine, made longer in the body, with the same trucks under it?

The only difference, except in the springs and wagon bolsters, between Winans's and prior inventions, is, *a change of proportions*. [Mr. Whiting here illustrated this proposition by explaining the models to the Court; substituting large wheels and long body on the Chapman and Tredgold models, produced the near coupling of the wheels in each truck, and the remote coupling of the trucks.] I refer to your Honor's opinion in the case of Wilbur vs. Beecher, on this point. (Pamphlet Report, p. 14.)

If these principles of law be correct, they answer most, if not all the Plaintiff's criticisms on prior inventions.

If any car like the Quincy car was used only for freight, it is not to be patented by Winans, because he uses it to carry passengers. Especially as his car is a freight as well as a passenger car; and his drawing is of a freight car only.

Whether the car is used to run fast or slow makes no difference.

Whether it is to be drawn one way or the other, is immaterial, since, in fact, no particular mode of traction is claimed.

Allen's carriage was used under a locomotive, yet if it were applied to a passenger car, it would be the same in principle.

If Winans can monopolize all eight-wheel running gear, Allen could not have applied it to his locomotive without infringing.

It is immaterial what load is borne by the platform, whether wood, stone, passengers, or a steam-boiler, or whether the machine move fast or slow, if it only has the capacity for slow and fast motion.

Even if the eight-wheel double-truck carriage had been made to travel on common roads, and had never been applied to railroads, and if Winans had been the first to make that application, he could not sustain a patent for thus applying an old machine to a new use, according to the decided case before cited, viz. Winans vs. The Boston and Providence Railroad Company.

How much less could he sustain a patent for merely making use of the same running gear, because he placed it under one kind of a platform or another, or carried one kind of burden rather than another, or merely altered the proportion of parts, without introducing any new principle of operation.

So also, if the Chapman or Tredgold car, were originally designed merely to distribute the stress of the load, or what is the same thing, the weight of the load—equally on eight wheels—or even if their plan was to place and retain the wheels at equal distances apart, along the rail, would it be any invention to put on a longer body instead of a shorter one, upon the *original* trucks, or to put passengers thereon, instead of freight?

If Tredgold or Chapman may answer a better purpose by merely *prolonging* the body, can there be invention in lengthening that body?

I have already denied such an hypothesis.

THE QUINCY CAR.

The *Quincy car* is the next subject for consideration. The Court has examined the model. It consists of a long bearing platform, which is made of solid timbers fastened together by two cross-pieces at the ends thereof, which, while they unite these long timbers, at the same time constitute the bolster pieces. The bolster pieces are penetrated by king-bolts, which pass through these, and through the middle of the ends of the centre timber ; the under part of each bolster is rounded up, and it is also armed with a transom plate and side bearings, which correspond to similar transom plate and side bearings upon the trucks underneath.

There are two trucks, one at each end of the bearing platform, swivelling under it, upon the king-bolts.

Each truck has four wheels, and a solid, rigid rectangular wheel-frame covered by a solid platform, and said wheel-frames have side pieces and double cross bolsters. The axletrees on which the wheels revolve are metal, and bedded in the cross timbers at each end of the wheel-frame. The bearing points of the wheels on either side of the truck, are about the same distance from each other as the width or gauge of the track. The diameter of the wheels is smaller than those in general use at the present time. The trucks are coupled by the body sufficiently remotely from each other to allow each to swivel entirely around without interfering one with the other.

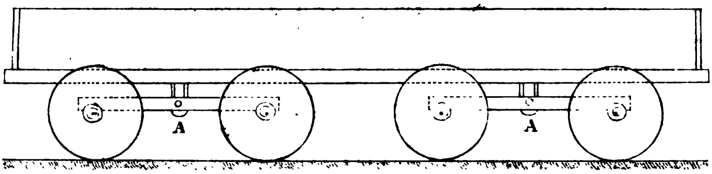
In regard to its mode of operation, it is precisely the same in principle as the eight-wheel cars now in common use ; the bearing points of the wheels being equi-distant with the gauge of the track, and the two trucks placed at or near the ends of the bearing platform adapt this car to a distribution of the weight equally upon the wheels, while the swivelling of the truck adapts it to pass smoothly and safely over the straight parts, curves and other inequalities of the road, and the peculiar shape of the bolster adapts it to conform to great and sudden changes of grade, and the side bearings to prevent the body from swaying or tipping one way or the other.

The said Quincy car does not contain the peculiar mode of

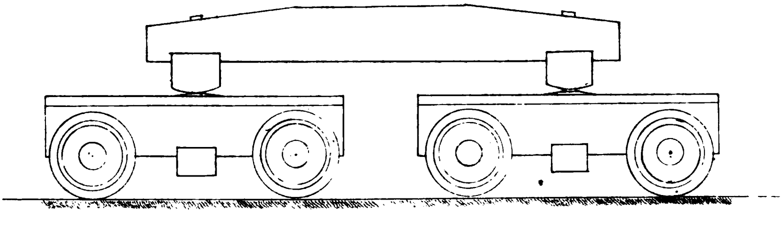
PLATE. IV.

TREDGOLD CAR.

Fig. 26.



QUINCY CAR.



uniting the axles of the wheels by a spring bolted to the boxes, and, owing to the small size of the wheels the flanges are not brought as near as possible together without coming in contact; but all that is material and essential in the arrangement of the eight wheels of the car, and the connection thereof with the body, is there reduced to practice in a manner which obtains all the advantages, while it avoids the defects of the arrangement as shown in Winans's specification. The trucks are placed as far apart as the length of the body will permit, and the wheels are brought so near together that their bearing points are as far apart as the width of the track; and this arrangement, on the whole, is better than a closer proximity of the wheels.

Four-wheel railroad cars having been before constructed and in use, and the Quincy car showing the manner in which two trucks could be placed under the ends of a car body, and there being nothing to prevent the builder from making the body as long as the amount of travel or transportation required, or increasing the diameter of the wheels, the constructor would be called on to do nothing else but merely change proportions and to substitute wheels, turning with axles, which were well-known equivalents for wheels turning on axletrees. It is true that various improvements have been applied to modern cars in addition to what is in the Quincy car; but the arrangement of the wheels and construction and connection of the truck with the body of the car, still remains the same in its essential character. And no invention would be requisite, so far as regards the arrangement of the wheels and the connection of the trucks with the body of the cars, to swivel to the curves and run smoothly and safely on the road.

The position of the bearing trucks is at the end of the body, precisely as Winans recommends. See his patent, Plaintiff's proofs, p. 114, fol. 13.

The existence and structure and date of the Quincy car, are proved by

1. Gridley Bryant,	Defendants'	No.	3,	p. 141.
2. Jotham Cummings,	"	"	2,	" 143.
3. Noah Cummings,	"	"	3,	" 145.
4. David R. Nash, .	"	"	3,	" 147.

(5.) John L. Cofran, on the part of the Plaintiff, confirms the same facts.

In regard to the experts on this subject, I will merely make reference to their names and to the pages where their testimony is to be found.

5.	John Murphy,	Defendants'	No. 4,	p. 7,	fol. 27–33.
6.	William Pettit,	"	" 4,	" 13,	" 51–54.
7.	Septimus Norris,	"	" 4,	" 1,	" 1–10.
8.	Joseph L. Kite,	"	" 4,	" 11,	" 41–50.
9.	M. W. Baldwin,	"	" 4,	" 3,	" 11–16.
10.	Oliver Byrne,	"	" 4,	" 9,	" 34–40.
11.	Richard French,	"	" 4,	" 6,	" 21–26.
12.	John L. Cofran,	Plaintiff's proofs,		p. 74,	fol. 349–352.

We have not a greater number of witnesses as to the origin and history of the Quincy car, because it was not supposed to be necessary, the dispute being about the principles of its operation, and not in regard to structure.

It is admitted that the invention and the public use of the Quincy car was prior to Plaintiff's alleged invention. On this ground, therefore, we rest in safety.

The construction of the car, as stated, is admitted. The only questions are, whether it embodies the peculiarities of Winans, or the true principle of the eight-wheel car, or substantially the *principle* of the eight-wheel car *as made by the Defendants?*

The Quincy cars being double truck eight-wheel cars for freight, with swivelling trucks, there is no denying that they embrace and embody all the general mechanical principles and arrangements which are essential to the organization of an eight-wheel double swivelling truck car, either for passengers or for freight.

After reading the affidavits, and particularly that of the distinguished mechanic who has attained so high a reputation in Massachusetts as a Civil Engineer, and inventor of the eight-wheel car, as well as a great variety of other railroad machinery, a man of high character as well as of inventive genius, whose name will be forever preserved in our history as the engineer and builder of the first railroad in the United States,—*Gridley Bryant*,—no one can entertain a doubt that his eight-wheel car, which was in full and successful operation in 1829, was designed and intended to answer the *same purposes*, (as to the transportation of freight,) as Winans's car was designed to answer when used for freight,—to carry the same more smoothly and evenly over the curves, straight parts, inclined planes and inequalities of the road. That the body or platform was made longer or shorter, according to the strength of the materials and the weight they were intended to bear.

The ease of motion attained by this car was produced by the same process, which Winans subsequently adopted, so far as regards the position of the trucks under the EXTREME ENDS of the body or platform, the length or shortness of the body being (by Winans's specification as already stated) immaterial.

So that the language of Winans's specification is an *exact description* of the Quincy car, as to the connection of the truck with the body by the swivelling pin, (excepting that the Quincy car had the addition of side bearings, and so do the Defendants' cars,) and an exact description of the arrangement of wheels in each truck, (except that the Quincy car uses the solid, rigid rectangular wheel-frame, and so do the Defendants, instead of the connection of the axles by the long springs;) and in the Quincy trucks the bearing points of the wheels on the rails are equi-distant with the gauge of the track, (and so are Defendants',) while Winans's are far closer together.

The Winans truck is constructed upon the theory of bringing the axles as nearly as possible to coincide with the radii of the curves of the road, while the Quincy truck and those of the Defendants avoid that theory as pernicious in practice.

Taking the Quincy car, just as it was in 1829, and as it is at the present day, and substitute for the freight platform a car body, and you have all that is really essential in the Defendants' cars.

It is true that many modern improvements have been added to make them pleasant and convenient; but so far as relates to all that Winans claims, viz.: the *arrangement* of the eight-wheels in two swivelling trucks, placed under the ends of the body, and the *connection of the body and trucks* by a king-bolt, so as to allow the trucks to swivel and conform to the curves and inequalities and straight parts and grades and inclined planes of the railroads, these cars are substantially the same.

And if, (as has been so often *asserted* and so often admitted on this trial,) the putting the wheels in each truck a few inches nearer to or more distant from each other, and placing the trucks nearer or more remote, under the body, (especially when they were originally placed under the extreme ends thereof,) cannot be a subject of *a patent*, cannot require invention, being merely an alteration of proportions, and not introducing any new mechanical principle into the structure; and as no other alteration whatever from the Quincy car is wanted in order to make the Defendants' cars, except merely lengthening the body, it follows that the Defendants do not infringe the Plaintiff's claims by using whatever is embodied in the Quincy car, including the arrangement of wheels there found, their connection with each other, and their connection with the body, and the placing of the trucks at the extreme ends of the body. If they do infringe Plaintiff's claims by such uses, then the Plaintiff claims what was in the Quincy car, and that being a prior invention, the patent is void. If, on the other hand, the Plaintiff's claims do not *cover* those arrangements, but only the peculiar devices of long springs and wagon bolsters, the Defendants do not use them, and, therefore, do not infringe.

I now propose to examine all the objections to the Quincy car that have been made, or that can be anticipated.

1st Objection. It is a car for freight.

Answer. So is Winans's; and it is immaterial to the construction of the running gear, whether the body or platform carries passengers or freight.

2d. The wheels are smaller than car wheels now used.

Answer. Mere change of proportion is not material, and the patent describes no particular size of wheels.

3d. The flanges of the wheels are not close together in each truck.

Answer. Merely increasing the size of the wheels (i. e. a change of proportions) remedies that matter of the approximation of the flanges; and putting on larger or smaller wheels does not vary the distance of the axes, nor, consequently, the distance of the *bearing points*, and there is no essential difference, whether the flanges are nearer or further apart.

The Court will understand me as speaking of the wheels in each truck.

The essential distinction is, that the bearing points in the Quincy car are distant from each other as far as the width of the track. It is the same in the Defendants' cars. It is not so in Winans's patent.

4th. That the body, or platform, is not so long as the Winans car, and does not extend the whole length over the platform.

Answer. The length of the body is not material, in principle, nor prescribed in the patent, so long as the bearing of the body or platform on the trucks is at or near the ends.

Whether the car be long or short, the principle is the same.

The platform or frame of the sixteen-wheel car, at Quincy, could have been as well put on to the eight-wheel car, and then the length of the car body would have exceeded Winans's. And what is more important is, that the shortness, or length of the body, is not a material part of Winans's plan.

The Quincy car is as long as Winans requires. See fol. 20, of patent, where he expressly says that the length of the body is not material, if only the trucks are placed at the extreme ends. Winans's patent is, therefore, no more for a long body than a short one. It is expressly applicable to any body or frame that will allow two of his narrow trucks to swivel under or even beyond its ends.

5th. That it was only made to carry heavy stones, that could not be subdivided.

Answer. As I have already stated, it is not material what kind of freight was carried.

6th. That it was not made for rapid motion.

Answer. Neither is it material how fast the owners chose to allow it to run, if it were *capable* of running fast. The principle is applied to and developed and embodied in the organization, and not the use. It would be strange if an ordianary road carriage, usually driven at a slow rate, could be patented because a fast horse were tackled into it.

7th. That the wheels were not of the kind most usually employed on railroads at the present day.

Answer. This is not true in fact. The wheels were constructed with a conical flange, and they operated just as ours now do.

Moreover, CONE wheels had been in use prior to 1825, and they were used in the Quincy cars. See Tredgold, Plate 111, Fig. 24, pp. 42—3; also, George S. Griggs, Defendants' No. 3, p. 104, fol. 414—18, and p. 110, fol. 438—39. And Winans does not designate one kind of wheels more than another as a necessary part of his organization; he claims the arrangement of every description of wheels.

8th. That the wheels turned ON their axles and not with their axes, and that this was less safe.

Answer. (*a.*) This is a matter of practice, not theory.

(*b.*) The Plaintiff's expert, Hibbard, does not assert, neither do any of the Plaintiff's witnesses say that this proposition is true; nor, if true, that it is material.

(*c.*) That the mode of substituting wheels revolving with their axes instead of on the axles, was well known to mechanics at that time, and has been described and shown to this Court, in several treatises published about 1825. As for instance in Tredgold, p. 13; in Wood, p. 77—8; and in Strickland, Plate 51.

(*d.*) It is admitted that it required no invention to make a substitute of these well-known equivalents.

(*e.*) No witness pretends that the slightest difference, practically, is introduced by the substitute.

(*f.*) Winans does not indicate the preference for one over another mode, even in the truck that he specially recommends.

(*g.*) Both kinds were in use at that time, and each had its advantages, therefore this objection is hypercritical.

(*h.*) The only expert of the Plaintiff metaphysical enough to cavil at the Quincy car, is Hibbard. Some of his objections have been stated by the Plaintiff's counsel and answered by us, and we shall notice and answer the remainder.

1st. He assumes that the object of the Quincy, and other cars, was merely the distribution of the weight over a great extent of RAIL.

If so, it would be immaterial. If Bryant, in accomplishing that object, made a perfect eight-wheel car, embracing all the essential principles of that used by Defendants, it is of no importance what his original design was.

But the assumption of Hibbard is incorrect. The real objects for which the car was made and used, are specially stated by the inventor in this affidavit, viz:—" To carry a large load on eight wheels without injury to the road; to turn the curves freely, descend the inclined plane, and run on the road, carrying the stone smoothly and safely as possible." Df'dts' No. 3, p. 141, fo. 563–4.

2d. Mr. Hibbard's second objection is, that in the bearing carriages the wheels are not so near as in Winans's trucks.

Answer. They are as near as the Defendants place them, and if not, the size of the wheels may be enlarged, and then they will be as near as Winans's.

3d. The third objection is, that the bearing carriages are not so remote from each other as Winans's.

Answer. They are at the extreme ends, which is the plan recommended in the patent.

(*i.*) The chief objection to the Quincy car is that it is was usually drawn by the truck and not by the frame or body.

Answers. 1st. That where there is but one car, and the cars are not in trains, drawing by the truck is as well as drawing by the body, because the unrestrained swivelling of the truck is not useful. It must be controlled when the axes of the wheels are very near together.

2d. Can it require invention to insert the drawing ring in one place rather than the other, after it had been demonstrated that the hind truck could be allowed to swivel freely ?

3d. There were two ways of using the Quincy car; one by traction and the other by gravity.

On the inclined planes nothing controlled the free swivelling of both trucks. They would be as free to swivel as though the car were pushed by a locomotive and by the body along a level track. The language of the patentee shows, that all the advantages of his arrangement may be obtained by drawing the forward truck by the perch, and he intended that his own car should be so drawn. The other objections of Mr. Hibbard have been answered before.

(*j.*) Mr. Keller adds an objection that the Quincy car had no conical wheels.

1st. This, if true, is of no consequence.

2d. It had conical wheels.

(*k*.) Again Mr. Keller objects, that for want of springs, the Quincy car did not so well adapt itself, to the change of grade.

To this I answer: 1st. That the bolster was rounded up.

2d. It did conform to very steep grades, even to an inclined plane.

These are all the objections.

Only one expert in the country dares *deny*, that the Quincy car contains an embodiment of all the substantial parts of the eight-wheel car of the Defendants.

The Plaintiff and his counsel knew all about this car, as early as June 4, 1853, and therefore can make no excuse that he has no opportunity or time to produce experts.

This fact is significant. The Quincy car has been in successful use from 1829 up to the present time, and had that road required passenger cars, these could have been used at once for that purpose.

The theoretical opinions of Hibbard, who never had anything to do with railroad machinery, and who has no practical knowledge on the subject, and the fine-spun speculations of the adroit and ingenious junior counsel of the Complainant, are all that is offered to over-balance the ponderous weight of authority of scientific and practical men, as to the principles of the Quincy car, and as to its embodiment of all the essential elements of the cars as made by the Defendants.

Now apply the same reasoning, as to the separating of the trucks, to this car as to Tredgold. The lengthening of the body still preserves the equal weight borne by each wheel, and the weight borne by each span of rail.

Also; the objects of the construction of the Quincy car are not left for inference, but are proved and not denied to be, not only to distribute the weight, but also to swivel and run smoothly and evenly.

Can it be while Winans says that the *length* of the body is not *material*, if supported at the two ends, as was the Quincy car, that we are to be deprived of using the Quincy trucks, under the *short or* LONG platforms?

THE ALLEN CAR.

I now pass to the subject of the running gear of Horatio Allen, as applied by him to his steam carriage.

We assert that this invention was prior in time to that of Winans.

Supposing Winans to have organized the running parts of the Columbus as the Plaintiff claims, the earliest date to which their evidence carries the first sketch, which preceded their first experiment is in February or March, 1831. And Mr. Elgar, being contradicted by all the other Plaintiff's witnesses, as well as by the Defendants', and swearing now what he swore he did not know at the Troy case on this very point, March, 1831, is the first moment at which the Plaintiff's "experiments" began.

Horatio Allen's invention was matured in his mind, in 1830. Had he stopped there this would be of no avail, but in the fall and winter of 1830 he made complete working drawings, very little like those that Winans *says* he made in the following March.

We have produced the identical drawings and plan.

The invention was pressed forward to a successful issue. The first machine was finished and put to use in the beginning of the year 1832, and so well was it liked that three others were also built and placed upon the road before the close of the year 1833.

Allen's first machine would have been built before the Columbus, had it not taken so much longer to build a locomtive than an ordinary car. We do not find here any series of failed experiments for three or four years; for the invention was complete so far as relates to the running gear.

To Horatio Allen belongs the honor of having made the first double truck running gear for locomotives in this country, which was not only perfect in respect to the arrangement and connection of the wheels, but also in the application of pedestals to the springs, the same as are now used on all cars and railroads; a fact that may well cause his name to be remembered with honor in connection with the history of railroads in this country.

If Winans failed in the Columbus, as the Plaintiff says, then Allen's invention was completed, while Winans was only making unsatisfactory experiments.

Mr. Keller argues that an invention is nothing in the eye of the law until it is embodied in some form of machinery—it is nothing while it is the subject of mere experiment. And so Allen's invention was nothing until his invention was completed; that did not occur until after July 4, 1831, and therefore Allen cannot be considered prior in time to the Columbus, which is claimed as Winans's invention!

This is his argument to show the alleged priority of Winans.

But in the next breath, it became necessary (in order to avoid the stress of our argument that the invention was *abandoned* from July 3, 1831 to October 1, 1834,) to take a new ground. He then says that Winans had made no complete invention in 1831, but was only trying unsuccessful experiments! and that he did not complete and embody his invention *until* 1834! In the latter supposition, he was three years subsequent to Allen! How unfair to assume such *inconsistent* grounds of argument!

Not only did Allen put his invention into successful operation, while it is said that Winans was experimenting, but he also made a report on the subject of running gear—the first on the subject—in 1832; which was printed, published, and circulated, explaining fully the whole philosophy of its structure, and which Winans some years afterward plagiarized.

I will now give your Honor a description of the model and drawings of the Allen Steam Carriage. It is borne by two trucks; each truck has four wheels in a rectangular rigid wheel frame, which preserves the parallelism of the axes; the points at which the wheels bear upon the rails are separated about equally to the width or gauge of the track, which distance is the most beneficial in actual use. The truck frame is united to the axes of the wheels by means of springs and pedestals similar to those now in general use, which, while it gave ease of motion to the burthen carried, effectually prevented the axes from, at any time, losing their parallelism, by confining the motion allowed by these springs at all times to planes perpendicular to the track and equi-distant from each other; thus the wheels were always kept square on the track. The four and hind wheels of the truck were of different diameters, but this fact is wholly immaterial. Each truck had a bolster running across the centre of the same, from side to side, and this bolster was connected with an upper bolster, on which the steam carriage rested, by means of a large swivelling pivot or king-bolt, operating also as a transom plate, and the trucks swivelling readily and freely to the curves and other inequalities of the road. There were also anti-friction side bearings upon each truck to keep the body of the steam carriage from rocking, and assist in supporting the same. The two trucks were placed so near the ends of the steam carriage, that the ends of the truck frames projected beyond the body; and this position was best calculated to sustain the weight of the body. A part of the body hung down between the two trucks. The body of the steam carriage was long, so that it readily rested on two four-wheel trucks, allowing them to swivel to the curves without interfering with each other; and the distance of the bearing bolsters was nearer to the ends of the body than the position now usually adopted in passenger cars, is from the end of the body platform. The said steam apparatus may be taken off, leaving the bolsters and all other parts as they were, and a platform or body for passengers substituted, without invention, and this carriage will then, as it did before, combine all the mechanical elements of the eight-wheel railroad passenger car, as ordinarily used, embodied in a manner exceedingly well adapted to pass smoothly, steadily and safely over the straight track as well as the curves and irregularities of railroads. Indeed, it contains all the most essential features of the running gear now in general use, and is far better calculated to attain the objects described in said Winans's specification, than the mode of arrangment which is recommended in the patent itself. The whole of the objects or beneficial results set out in said Winans's patent, and much more, are attained in said Allen's Steam Carriage.

The witnesses who prove the Allen engine are—

Horatio Allen, Defendants' No. 3, pp. 60–62, 63, 64, fol. 240 to 254.

Christian E. Detmold, Defendants' No. 3, pp. 56 to 60, fol. 225, 227, 228, p. 58, fol. 232 to 239.

To show that the running gear is identically the same in principle and mode of operation, as that of the cars built by the Defendants, we refer to the testimony of

Charles B. Stuart,	pages	91–2,	fol.	364, 5, 6.
Wm. J. McAlpine,	"	95	"	378, 9, 380.
Vincent Blackburn,	"	98	"	391, 2.
Walter McQueen,	"	102	"	407, 8, 9.
Albert S. Adams,	"	116	"	463, 4, 5.
James H. Anderson,	"	119	"	476, 7.
John B. Winslow,	"	122	"	487, 8.
John Crombie,	"	127, 8	"	508, 9, 10.
H. W. Farley,	"	131	"	521, 22, 23.
Godfrey B. King,	"	8	"	306, 7.
William C. Young,	"	151	"	604, 5, 6.

What are the Plaintiff's criticisms on the running gear of the Allen carriage?

1st. That the running gear was applied to a locomotive, and not to a passenger car. My answers are,

1st. Take off the boiler, and you can substitute a platform for freight or passengers.

2d. This change removes all machinery for locomotion, which is the only alleged impediment.

3d. Such a change requires no invention.

4th. Winans's running gear is as applicable to locomotives, as to freight and passenger cars.

5th. Changing the use is no change of principle.

6th. Cars are now made, called steam cars, having the locomotive in the forward end of the car.

The second criticism is—That the carriage is shorter than the length of 20 to 24 feet, recommended by Winans.

Answer. This is a mere change of proportion, and the length of the body is stated in the specification (fol. 20) to be immaterial.

3d. That the wheels are of different sizes.

Answer. As I have already shown, this is immaterial.

4th. The flues of the engine clogged, and the engine was given up.

Answer. That the running gear was perfect, and was repeated on three other engines. There has been a great improvement made on engines, but not in the running gear; and the running gear was on the same principle as that now in use in all parts of the country.

5th. That the Defendants have failed to state in what manner it was connected to a train of cars. They then *infer* that such connection was fatal to the free swivelling of the hind truck.

Answer. Allen's Report shows that he was fully aware of the importance of sufficient freedom of swivelling. This is therefore an unjust inference.

The same objection may be made to the Plaintiff's patent, for it does not describe or show how it was to be connected with the train; though we have shown by reference to facts *dehors* the patent, that it was to be drawn by the perch.

6th. That the eight wheels were equi-distant, and the two tracks not separated far apart.

Answer. They are the same distance apart from centre to centre in each truck, as those made by the Defendants; and that the distance of the trucks depends wholly on the length of the body, which is a mere change of proportion.

7th. That two of the wheels on each truck were used as driving wheels.

This is not material, unless this fact prevented the truck from swivelling sufficiently freely to enable it to conform to the curves. And the evidence is that the trucks did so swivel; and experiment is better than theory.

Moreover. Absolute freedom of swivelling is not requisite, otherwise the truck might turn crosswise on the track.

The use of the wheels as driving wheels, could make no difference in the swivelling, because the whole truck was free to yield to the guidance of the rails, and it would make no practical difference whether the tractive power was communicated through the king-bolt, or directly communicated to the axles.

8th. That the connection of the steam machinery with the running gear, is not shown on the model.

Answer 1st. It was not necessary.

2d. It is shown in the drawing.

3d. It is stated in Allen's affidavit, and explained to have been such as to allow of perfect freedom of trucks to swivel. This is an unfair objection.

Thus we find in Allen all that is essential in the Plaintiff's cars, and all he claims, except the *spring trucks* and the *wagon bolsters*.

1st. The two four-wheel trucks.

2d. Their arrangement at or near the ends of the body.

3d. The wheels and flanges very close.

4th. The trucks as far apart as conveniently may be.

5th. The trucks free to swivel.

6th. The purpose, viz., the distribution of weight, and ease and safety of motion.

The Plaintiff's Counsel has said, that if these cars would suggest the idea of the eight-wheel car, Allen was just the man to make one; and so we say he would have done, if such cars had been wanted, for it required no invention to do so.

Merely taking off the boiler, and putting on a long body, would remove every objection of the Plaintiff.

This would merely be applying Allen's invention to a new use, making only an obvious change.

But the railroad companies were not in favor of eight-wheel cars at that time, nor for many years after Winans's patent was dated; and therefore Allen had no occasion to apply his invention to that use.

This carriage, then, (as well as the Quincy car,) is conclusive, taken in connection with the drawings and the reports, which states:

1st. The objects to be attained.

2d. The mode of attaining them.

3d. Their success.

Who denies that the Allen carriage embodies all the principles of Winans's claim? if he claims any thing beyond the above mentioned peculiar devices. And if any—on what ground?

Not one expert has denied it; and no one but the Counsel asserts it. Can the Court hesitate in their decision?

THE BALTIMORE CARS.

I now pass, with great brevity, to say a few words on the Baltimore Timber, Trussell, Wood and Platform cars. They were constructed as follows:—

Two ordinary bearing carriages, or trucks, (such as were in common use at that time on the Baltimore and other roads,) having rigid rectangular wheel-frames, bearing four wheels each, and having the flanges distant from six inches to two feet, were connected together by a long platform composed of string-pieces of timber; these string-pieces were bolted on top of an upper bolster, so as to constitute a frame-work platform; the bolsters of this platform rested at each end upon two corresponding *under bolsters*, which last mentioned bolsters were fastened upon the bearing carriage. A king-bolt or centre pin connected the upper and lower bolsters, so that the trucks were free to swivel to the curves of the road. The bolsters were under the ends of the platform, and the trucks were drawn by the perch. The wheels in each truck were close together, in some of the trucks, and farther apart in others; but in all cases the two trucks were placed as far apart from each other as the length of the long string-pieces would allow. So that this rude structure combined all the essential elements of the common double truck eight-wheel swivelling car. When used for carrying cord-wood, upright standards were added to the platform, in order to keep the wood in place. When horses and carriages were to be transported, cars were built with long *trussells* instead of a mere platform.

It is proved beyond a doubt,

1st. That the "Timber cars" were running on the Baltimore and Ohio Railroad in May, 1830.

2d. That the "Wood cars" were running in November, 1830.

3d. That the "Trussell cars" were running in December, 1830, being at least six months before the Columbus was finished, and four months before she was begun, and before the plan was produced by Winans. We have shown, conclusively, that Mr. Elgar was mistaken in HIS dates, and that his evidence has been overthrown by all the other testimony in the case, on the part of the Plaintiff as well as the Defendants.

And I take pleasure in saying, that I do not believe that any one of the witnesses, whose testimony is used on either side, intended to make false statements; but that any witness may have innocently made mistakes of facts and dates, is most obvious.

The witnesses for the Plaintiff, who in any wise conflict with our testimony on these cars, are the following, viz.:—

1. John Elgar.
2. William Woodville.
3. Michael M. Glenn.
4. Oliver Cromwell.
5. Thomas Walmsley.
6. Henry R. Reynolds.
7. John P. Mittan.
8. B. H. Latrobe.

Those who must know, and who do not dispute the facts as we state them, as to the "Trussell car," are:—

1. Philip E. Thomas, President of Baltimore and Ohio Railroad Company.
2. George Brown, Treasurer.
3. Lloyd Claridge, Carriage painter.
4. John Ferry, in the Transportation Department.
5. Thomas Davis, Conductor.
6. John P. Mittan, Carpenter.

Your Honor will see that pretty nearly half the witnesses connected with the Baltimore and Ohio Railroad do not deny the fact which we assert, viz.: that these Wood and Trussell cars existed at the time when we state they were on the road. And if you will notice the extraordinary enterprise in procuring, and the adroitness in framing the affidavits on the part of the Plaintiff, such a fact would not have been overlooked; it would have been positively denied unless it were true.

This argument is strong. Four only out of the eight witnesses produced by the Plaintiff, swear positively that these cars did not exist.

John Elgar states his belief;—William Woodville is positive;—Michael M. Glenn rather dodges the question as to the "Wood cars," and contradicts himself as to the "Trussell cars;"—Oliver Cromwell "verily believes;"—Henry R. Reynolds is positive;—Thomas Walmsley has an impression, but is not positive whether the Wood cars were used before 1830 or not.

But all the witnesses throughout the case, and the counsel on the other side, have admitted the preëxistence of the Timber cars.

Now it will be one of the pleasantest duties of your Honor to reconcile the testimony on both sides. This can easily be done.

The counsel on the other side admit that double truck Timber cars existed before the Columbus, though they say that they were not fastened together, so as to constitute an organized machine. Our witnesses say that the machines were organized at that time. Nothing further was necessary than to drive four spikes into the string pieces, and that would be all that was to be done, in order to complete their organization. And the only question on which the dispute arises, is, that whether those spikes were driven so that the Timber cars had their string pieces fastened to the bolsters, so as to make a platform; or whether they were left to slip about upon the bolsters, as chance or accident might require.

Now as the load of timber upon these stringers and bolsters, would, by its own weight, keep the mass from slipping or swaying on the bolsters, no one, except his attention were particularly called to it, would notice whether the two string pieces were bolted to the bolsters or not. And when a change was made from the first rude manner of laying the timber across the two bolsters of the two trucks, to the more convenient mode of fastening the outside stringers to the bolster, is it not possible that some of the witnesses might not have noticed so slight a change, and especially as it is certain that their attention was not drawn to it?

It is another fact, which all admit, that the double truck "Wood and Trussell cars" existed at *some* time. The difference between the witnesses is only a question of *date*. And I will call your Honor's attention to the fact, that one of the Plaintiff's witnesses, upon whom they rely, states that he thinks he saw them in 1832. If some of Plaintiff's witnesses did not see them until 1835, and others saw them in 1832, then it follows that the cars were in existence in 1832; and if they were in existence three years before they were seen by these persons, it is quite likely that they may have been there five years without their knowing it. This, we say, was the fact.

The Plaintiff's witnesses were not the persons who made the cars, while the Defendants' witnesses originally made and subsequently repaired them. A number of the witnesses for the Defendants actually left the road and left that part of the country; these cars being at the time in daily use, long before the date at which the Plaintiff's witnesses say that they made their *first* appearance on the road, so that there is no possibility of a mistake about the fact. Those who say that they did not see them, we presume, did not notice them; nevertheless the cars were there, else they could not have been seen by so many others.

Some of the Plaintiff's witnesses admit what we say, in part.

May, the Plaintiff's witness, p. 124, fol. 542, says that he thinks he saw them in 1832.

If so, all the Plaintiff's other witnesses are wrong. If one of them did see them in 1832, then they were there, and all the evidence of those who did not see them goes for nothing.

The witnesses on the part of the Defendants, who fix the time when these cars were built and put in use, are:—

1. Jacob Rupp.
2. Leonard Forest.
3. John Rupp.
4. Conduce Gatch.
5. Edward Gillingham.
6. William E. Rutter.
7. John H. McClain.
8. Edward May.
9. Henry Shultz.
10. John M. Eichelbergher.
11. James B. Dorsey.

When eleven men swear that they actually saw these cars in existence, at a certain time, will the Court say that the testimony of six negative witnesses shall outweigh them on a point of date?

The existence of the "Trussell cars," as early as 1830, is proved by documentary evidence, in the pay-roll of December, 1830, made by Conduce Gatch, which also mentions that they were made in that month, for the transportation of horses and carriages.

Additional proof is found by reference to the Baltimore Gazette of Dec. 17th, 1830, and the Baltimore American of Dec. 18th, 1830, which mention the fact that the wife of Ex-President

Adams was at that time transported on the railroad, and that her horses and carriage were placed in a *Trussell car*, attached to the train; and the Baltimore Gazette of Jan. 19th, 1831, Defendants' No. 3, p. 46, mentions the Wood cars.

It is, therefore, indisputably proved that these double truck eight-wheel cars existed and were in public use on the Baltimore and Ohio Road prior to the Columbus.

Next in order came the "Columbus," and we hold that it is indisputably *proved* that the person who planned the running gear of the Columbus, and its connection with the body,—being in fact nothing new,—was *Conduce Gatch*, and not Ross Winans.

Who arranged the "RUNNING GEAR" of the Columbus?

We admit, that the size and shape of the *body*, although merely copied from Smith's model, which was placed in the office of the Baltimore and Ohio Railroad Company as early as 1830, was then first introduced on to the Baltimore and Ohio road; and that this car body, by its unusual length, being twice as long as the four-wheel cars for passengers, would attract attention, even though the new body was in fact placed on a *platform* constructed in the old way, with *the old* running gear.

The testimony on the subject, as to who made the Columbus, is conflicting, if you do not discriminate between the making of the car as *a whole* and the *mere arrangement* of the running gear; but it will not be difficult to settle the question, who arranged the latter.

The Plaintiff attempts to show that Winans was the person who first planned the running parts of the Columbus, and to show this, he relies on a certain working drawing, from which *he says* the car was actually built.

He finds a number of witnesses who say, that he "*produced*" this drawing.

No man swears that Winans made it, and what is a little singular, Winans himself does not state in any part of his own affidavit that he made it or directed it to be made.

The next question is, whether that drawing thus produced, contained, at any time before the car was actually built, the running gear?

On this, the weight of the testimony is decidedly with the Defendants.

Suspicion is thrown upon the drawing itself, which has been produced.

1st. It is smoked to give it the appearance of age.

2d. It does not look like a drawing that had been worked from in a shop. And if your Honor will compare it with the Allen drawing, which is in reality a working drawing, the difference will be striking.

3d. It has been altered in many important particulars, from its original state.

Any tampering with a drawing destroys its force as evidence, except as against the party producing it.

4th. The car Columbus as actually built, did not correspond with the drawing in about seventeen particulars; but I shall not occupy the time of the Court by dwelling on one of them, they have already been pointed out by my colleague.

5th. *The positive testimony of those who* MADE *the running gear is, that there was no running gear on the plan.*

6th. The uselessness of making a drawing of the running gear when there was no alteration to be made from the ordinary running gear, that had been previously used on the Timber, Wood and Trussell cars.

7th. As to the dimensions alleged to have been taken by Conduce Gatch from the plan, it was necessary to measure the body, in order to ascertain the position of the king-bolt, and thereby, ascertain the *length of the perch* suitable to the car. No one says, that he took the slightest admeasurment of the running gear, or any part of it.

Therefore if Winans made the drawing, it did not show the running gear, but only the body.

As to the directions to workmen said to have been given by Winans, the Plaintiff's witnesses state, that he gave some directions, but they do not mention one word that he said.

On the other hand, the Defendants' witnesses swear that all the directions he gave related to other subjects, and were subsequent to the building of the Columbus.

The Columbus was built at the Mount Clare shop, and the directions were given at the Charles Street shop, and at George Gillingham's shop, where Winans's patent *friction wheels* were made.

The mere vague *reputation* relied on by the Plaintiff's counsel, that Winans was the inventor, and was talked of by some individuals as the inventor, is the most flimsy species of testimony.

The reputation among the makers of the trucks, and many others, was wholly in favor of Gatch, as the inventor of the arrangement of the running parts.

Winans might have styled himself the inventor of the car, and he might have been called so by others, but though he only put a different body, on the common running gear, yet it might have been called " Winans's car," in that sense of the word.

Many no doubt thought that the car, as a whole, was new, although there was nothing new in it in reality, except the body; and although the connection of the wheels with each other on trucks, and the connection of the trucks with the body, was the same as in the preceding Wood and Timber cars; yet, applying the old arrangement to a new and large body, and to the new use of transporting passengers, nothing would be more natural than to call it the Winans's car; and to name Winans as the inventor of it, and that reputation is in no degree inconsistent with the testimony of the Defendants' witnesses, which is, that so far as relates to the arrangement of the *running parts*, Conduce Gatch first invented that arrangement and applied it to the cars which preceded the Columbus; and afterwards, when the Columbus was built, applied the same arrangement to it.

If that suggestion shall enable the Court to reconcile a mass of testimony which would otherwise be conflicting, I shall feel myself rewarded for the time I have spent in explaining it.

Now, has your Honor, in the course of your judicial experience, tried a single case in which the Plaintiff has laid claim to an invention, of any description, without proving a solitary fact connected with its early history beyond this; that he had in his possession at a cartain period a certain drawing; and such an one as I have demonstrated this to have been?

As it is therefore not proved that Winans actually made any drawing from which the Columbus was built, upon what evidence does the Plaintiff rely to show that allegation?

Certain witnesses are produced, who attribute the invention, as a matter of *rumor*, to the Plaintiff, and who also say, that they never heard of any one else claiming it.

Not one witness proves a fact, except from mere hearsay, to show that Winans invented or devised any thing.

Not one swears to a single specific direction given by Winans to any person about the running gear.

Not a man who worked on the running gear ever heard any direction given by Winans on the subject.

The Counsel rely on mere hearsay of gentlemen in office, and not on the hearsay of the men who worked on the trucks.

It would have been easy for Winans to have manufactured this hearsay, by conversation with his friends.

These gentlemen might have been easily deceived about the eight-wheel cars, owing to the fact that Winans had gotten up numerous four-wheel cars, known as Winans's cars.

By comparing the position and opportunity for knowledge of these two classes, the Court cannot hesitate to say, that the presumption would be, that those actually engaged in the manufacture of the Columbus, would best know who devised the plan of the different parts, and who gave them directions about the work.

The preponderance of evidence, therefore, is decidedly with the Defendants.

Among other corroborating circumstances, I may mention that all new improvements were specially noticed, and credit given to the supposed inventor, in the "American Railroad Journal."

The Columbus is not noticed as a new invention. The eight-wheel car was occasionally mentioned, though not in connection with Ross Winans as the inventor.

The Engineer's reports to Mr. Thomas, the President of the Baltimore and Ohio Railroad, never mentions Winans as the inventor.

The President's report, in October 6th, is the first publication that mentions the thing in connection with Winans's name.

The peculiar circumstances under which that report was made, show the mention of his name to have been a matter of arrangement between Mr. Thomas and Mr. Winans; Mr. Thomas professing to recapitulate facts stated in the reports made by the Engineer and others to him, and referring to those reports as the foundation on which his statements rest, is not *justified* in any such statement by the reports of Knight and Gillingham, to which *he* specially referred.

Knight was the superintendent of the road, and Gillingham was the master of machinery, and therefore it is strange that they should not have noticed, in their reports, so important a fact as the invention of a large passenger car, upon a new principle, if such an invention had been supposed by them to have been made by Winans.

Ross Winans himself has not stated in his affidavit, that he did devise or have any thing to do with the running gear of the Columbus.

And it seems to me most extraordinary, if he did invent it, that he should rely upon mere hearsay to prove the fact, and upon a drawing which has been tampered with; and that he should not even have asserted the fact upon his *own oath*, while he has stated many other things in his affidavit, which are of far less importance than this would be, if true.

Now the *burden of proof is upon the Plaintiff*, *to show that he did invent the Columbus*, the alleged invention being so long anterior to his patent. And this is true, notwithstanding the patent is itself prima facie evidence of the originality of the invention there claimed.

Has the *Plaintiff* sustained this burden of proof? So far from it, we assert that the weight of the Defendants' testimony, which is positive, *far* exceeds that of the Plaintiff, which rests upon mere hearsay.

And it follows, that Winans, not being proved to have been the inventor of the running gear of the Columbus, his invention will take date, not in 1831, but in 1834; thus giving priority to many cars which were of a date subsequent to 1831.

JERVIS'S ENGINE.

I just allude, in passing, to the fact, that in 1833, Jervis produced his engine, a printed description of which is in the "American Railroad Journal."

I mention this in its chronological order, and refer to the following witnesses:

1st. John Edgar Thompson.

2d. Asa Whitney.
3d. David Mathews.

[Mr. Whiting here described the running gear of the Jervis locomotive, which had ONE four-wheel swivelling truck under the forward end of the engine, and then proceeded :]

And, Sir, there is nothing left to be done but a duplication of trucks under the same engine, to make the running gear like that of the Defendants. With that remark, I dismiss this machine.

FAIRLAMB'S CAR.

I now pass to the patent granted to Fairlamb, and refer to the testimony of

1st. Jonas P. Fairlamb.
2d. Isaac Knight.
3d. George Beach.

And, if the Plaintiff did not invent the Columbus, and embody his perfected invention therein, Fairlamb will precede Winans.

In the drawings of Fairlamb are clearly shown the peculiarities claimed in said Winans's patent, excepting that the axles of the wheels are borne by a rigid rectangular wheel-frame, and not connected together by yielding springs. The close proximity of the flanges of the wheels, in each truck, is there shown, the flanges being represented as but a very few inches apart. The trucks are constructed in two ways ; one allows the axes of the wheels a certain limited motion in the truck frame itself, with a view of allowing it to conform to sharp curves, as represented in Figure 1 and 2, while the other truck in Figure 2 is constructed in the ordinary manner, allowing no play to the axes ; each of these trucks swivel under the body by means of large transom plates, and are placed near the ends of the body of the car. Fairlamb's drawings embrace all of Winans's arrangement. One of the trucks in Figure 2 allows the axles to play, and the other truck is the rigid wheel-frame holding the axles parallel, as is the case in the cars in general use. So far, therefore, as regards the near coupling of the wheels in each truck, and the remoteness of the trucks from each other, it is identically the same as Mr. Winans's.

A mechanic of ordinary skill in car building, having laid Fairlamb's drawings before him, and adopting the truck in Figure 2, which holds the axes parallel, or in other words omitting the apparatus which permits the axes to vibrate, and constructing both trucks alike with parallel axles, would have nothing to do but copy the drawings in order to construct an eight-wheel car, such as is in common use, excepting that the wheels in each truck would be closer together than those in general use, thereby more resembling the arrangement claimed by said Winans.

Thus the drawings show completely and distinctly a double truck railroad car, (unfortunately) so like that described by Winans in his patent, as to be of little use at the present time.

The drawing is substantially a copy of the same that was attached to the original patent, although both had been restored. See Fairlamb's affidavit.

If Fairlamb had arrived in 1832, as he states, to this arrangement of the wheels and trucks which Winans particularly describes and recommends in 1834, he had only arrived at an erroneous conclusion, and one useless in practice.

We do not say that this patent was prior to the Columbus, but that, if Winans has failed to sustain the burden of proof, to show that he invented the Columbus, then Fairlamb is prior to Winans, the date of the patent being January 19, 1833.

Next came the "Winchester," which was put on the road in March, 1834.

THE VICTORY CAR.

Then came the "Victory," of Philadelphia. The plans of this car were completed in June, 1834, and she was commenced in August, 1834; so that long before his patent, Winans had an opportunity to see every thing that was contained in the car.

The Victory was completed on the 3d of July, 1835; she was thirty-five feet long, and was then put in use, and she was the predecessor of the Washington cars.

But the builders fell into the mistake of putting the wheels too close together, perhaps copying the mistaken philosophy of Fairlamb or somebody else. They had to alter the trucks by spreading the wheels farther apart. See French's affidavit, p. 5, No. 4.

The witnesses as to the "Victory," are,

1st.	Laban B. Proctor,	Defendants'	No. 3,	p. 7.
2d.	John Murphy,	"	"	9.
3d.	William Pettit,	"	"	12.
4th.	Joseph L. Kite,	"	"	32.
5th.	Harmon Yerkes,	"	"	35.
6th.	Jacob C. Carncross,	"	"	36.

Next to the Victory, (which drew by the body,) came

THE WASHINGTON CARS.

These cars were not begun till *November*, 1834, more than a month after the patent was issued, and they were not, at first, planned to draw by the body, but were intended to be drawn by the perch, like the others which had preceded them; and this alteration was suggested by Rupp, after building the freight cars. See testimony of Rupp and others.

I will now mention the order in which these cars succeeded each other.

1812. The Chapman car.
1825. The Tredgold car.
1825. The " eight-wheel steam carriage.
1829. The Quincy car.
1830. The Baltimore timber cars.
1830. The Baltimore wood cars,
1830. The Baltimore trussell cars.
1830. The Allen car or carriage.
1831. The Killeyney-Kill and Dalkey car.
1831. The Columbus, and great numbers of wood, and horse and carriage cars.
1833. The John B. Jervis truck engine.
1834. The Fairlamb Patent.
1833–4. The Dromedary, the Winchester, and the Comet.

June, 1834. Drawings made of the Victory in Philadelphia.
Aug. 1834. The model of the Victory was made, and the car commenced.
Oct. 1st, 1834. Winans's Patent.
July 3d, 1835. The car Victory completed, and in use, being the predecessor of the Washington cars.
1835. Rupp's 110 Freight cars.
1835. The Washington cars.
1835. The Alleghany, and numbers of cars at Philadelphia.

Such is a description of the various inventions which preceded the Columbus, and also of those which preceded the Plaintiff's patent, and such are our answers to the criticisms made upon their structure.

STATE OF THE ART.

It will now be my purpose to give a brief summary of the state of the art of building eight-wheel cars up to March, 1831; and before the Columbus was begun, the following parts and combinations were known and in public use.

1st. The car body, at least twice as long as the common four-wheel car, as were the Trussell and Wood cars, &c., and the freight cars on the Killeyney-Kill and Dalkey Railroad. Indeed, using two trucks required the body to be about twice as long as a single truck.

2d. The apparatus for allowing the trucks to swivel under the body, consisting of the king-bolt and transom plate, &c.

3d. The two trucks, one under each end of the body or platform.

4th. The wheels in each truck, put within six inches of each other, while others had the bearing points equi-distant with the gauge of the rails, and at all intermediate distances. See Mc Mechen, p. 41, Defendants' No. 3.

5th. The trucks placed at the ends of the body, as in the Quincy car, and near it as in the Trussell and other cars.

6th. Wheels of different sizes, large or small;—some revolving on the axes and some with the axes.

7th. Springs applied, in various ways, to eight and four-wheel carriages; not, however, like Winans's; but like those now in use, as the Allen carriage, and in the common four-wheel trucks mentioned in the patent.

India rubber was applied by Conduce Gatch under the bolster in the summer of 1831, which was suggested when the Columbus first went out. Tredgold also mentions them, and other works shown to the Court.

8th. The rigid rectangular wheel frame was also in common use, though not adopted by Winans.

9th. Side bearings were also used, though not adopted by Winans, also the trucks and the draft by the middle of the ends of the body.

10th. Thus, so far as relates to the arrangement of the wheels, as to distance from each other, and as to the remoteness of trucks from each other, no change had to be made from what was well known, even in building the Columbus.

The only change, as before stated, was in 1st. The springs; 2d. The wagon bolster.

11th. Nothing was left to be added, even to the philosophy of the subject, and no new principle to be illustrated after Allen's Report in 1831 and Jervis's Report in 1833.

Winans's specification was a mere re-hash of Jervis and Allen.

12th. Even the long body had been extended far longer than Winans describes. The Victory, begun in September, 1834, was thirty-five feet long, which was three times as long as the four-wheel cars.

Here we have all the *principles* of the eight-wheel car, with *a great variety of modifications, embracing all that the Plaintiff claims, except* THE SPRING TRUCKS *and* WAGON BOLSTERS.

The Plaintiff attempts to show that at the time the Columbus was introduced, a new era had arisen in the history of railroads; that greatly increased rates of speed were required, and that, therefore, some new arrangement of the wheels became necessary, to meet the emergency.

This is not true; but the fact is, that the new era consisted in the improvement of the locomotive.

1st. In traction by friction.

2d. By turning the waste steam up the funnel.

The running gear, then already made, was as well adapted to running fast as slow.

The great step from the four-wheel car to the double swivelling trucks, had already been taken before Winans's appeared, by Chapman, Tredgold, Allen, by Bryant, at Quincy, and by the Wood and Trussell cars, at Baltimore.

There was nothing left to do, except to make such a change in the proportions of parts, as experience should determine.

The eight-wheel car, as known and described and used before 1830, was adapted to *any size*, *any length*, *any distance of wheels*, *any curves and any inequalities.*

The demands caused by increased business and speed required greater and increasing departure from what Winans describes as *essential.*

PROGRESS OF INVENTION.

Every invention may be said to have its *own history.* I had intended to attempt to develop the progress of improvement in the eight-wheel car; but time will not allow me to go into details.

The Wood, Trussell, Quincy, Allen and other cars had been the legitimate product of the necessities of railroads (having sharp curvatures) in the earliest periods of their existence.

It is most probable that inventions resulting from the actual and practical necessities of the case, should be made by those who are earliest concerned in building the roads and in constructing the machinery necessary to operate them. As my able colleague has well said, in 1828, or thereabouts, Ross Winans was a common mechanic, having nothing to do whatever with the subject of railroads. Conduce Gatch was a regular practical millwright and machinist, devoted to that branch of business which has educated such men as Oliver Evans, and others of the most distinguished machinists and mechanics and inventors of the day. Mr. Gatch was a shrewd and close observer, a fine mechanic, a practical man, greatly relied upon and respected. He is attacked because HE CLAIMS *some inventions!* The *evidence* shows how his *mind* was at *work.*

Any man would observe, in shoving a railway truck around a curve, or in seeing a horse draw it, that coupling the axles of the wheels within a few feet of each other would make the truck run easier. This was a common, well-known fact. For that reason the wheels were placed near together on the four-wheel cars, and the four-wheel car was in fact so constructed as readily to pass all the curvatures and inequalities of the road. Then it became necessary, in the *construction of the roads*, to transport long timbers, and as they could not be placed, without danger, upon a single truck, they were borne by two bearing carriages; and as it was perceived that in turning curves the bearing carriages would swivel *under the timbers*, therefore, it was necessary to put on a swivelling bolster, which was a common device, to enable the *trucks* to swivel without *displacing the load.*

Then it became necessary to carry long loads of cord wood and other long freight, like carriages and horses, which could not be contained in the length of a four-wheel car.

In order to do this, they constructed a bearing carriage, *fastening the timbers to the bolsters*, so as to make an organized rigid bearing platform. They also made a Trussell body, resting at its ends upon the two trucks, to carry carriages and horses all harnessed together, like that of the wife of Ex-President Adams, on December 17th, 1830.

This running gear embodied a nearness of the wheels in each truck, and a remote coupling of the two trucks, fully equal to that which is used at the present day; and moreover, if the ordinary trucks in use at that time were the ones put under the Trussell cars and the Wood cars, those cars would come under the precise terms of Winans's patent, where he states that the ordinary bearing carriage may be used, unless indeed a variation of some six or seven inches between the axes in each bearing carriage is supposed to introduce an entirely new mechanical organization and mode of operation in the truck.

In fact, the centres of the axes in the fictitious drawing annexed to his patent, show the distance between the axes to be about three feet, while the patent itself admits that the ordinary bearing carriages, or some of them, had their axes only three and a half feet apart. In reality however, the evidence shows that the distance between the axes of the bearing carriages had been much nearer than three and a half feet.

Indeed, no single advancement in the development of the railroad machinery is attributable to Winans, though eager to grasp at every patent of every trifling, supposed improvement.

Not a single one of the pretended improvements of Ross Winans before the date of his patent of October 1, 1834, which were ushered into the world with such pomp and parade, is in use, at the present time.

The pretence that Winans made the first suggestion, as to the application of SPRINGS to trucks, is ABSURD as well as untrue. Such springs were in common use. They were described in all the books; and the pedestal springs now used were actually IN USE on *Allen's locomotive* before Winans ever spoke of them to ANY ONE.

Even the present form of the CAR BODY (change from the old *coach* body to the SQUARE now used) was first made and modelled by JOSEPH SMITH of Philadelphia in 1828 or 1830:

(See affid. of JACOB SHRYACH, p. 39, No. 3, etc.)

which pattern Plaintiff BORROWED in 1837 or 8, to MAKE a DRAWING of.

The MODEL of Smith's CAR was made *in Baltimore*, Plaintiff's residence, and it was left by Smith at the OFFICE of the Baltimore and Ohio Railroad Company the SAME YEAR, and undoubtedly was seen by Winans before he began to think about the Columbus.

Even his pretended improvement in the construction of the Washington cars, which have been alleged to be a sort of pattern for those which have followed, was already invented; and the cars were under way and first put in use at Philadelphia before the Washington cars were built. And the plan of the Philadelphia car is undoubtedly the progenitor of the plan of the Washington cars.

Therefore we cannot trace the hand of Ross Winans, in truth, to any one of these improvements. The fact that Winans was an assistant to a *civil* engineer, even if it were inferred from that fact that it was his duty to invent or suggest improvements, has no tendency to show that he did make any substantial and valuable invention. And while he made certain supposed improvements like the friction-wheel, which though extravagantly praised, turned out worthless. The country is under no obligation to this gentleman.

The only way that Winans is known to the country is, that he and Gillingham purchased the patent of Phineas Davis, for the chilled wheels, with a wrought iron ring in them, after Phineas Davis, in 1834, was accidentally killed by a locomotive on the Baltimore and Ohio Railroad; and by the notorious failure of his Crab engines in Massachusetts.

The only instance in which the Winans car has been TRIED, was with SADDLES to the springs, and even then it was CONDEMNED as WORTHLESS.

See affid. JACOB SHRYACH, p. 40, No. 3, and others.

Indeed so far from the present eight-wheel cars being indebted to Winans, they have many improvements not thought of in Winans's time; and a different construction and arrangement, and numerous improvements or inventions, not described in Mr. Winans's specification.

They have rigid square-sided wheel frames, pendulum or swinging bolsters; they have male and female transom plates for the trucks to swivel upon; have pedestals and springs to allow the axles to move vertically and still keep them parallel with each other, and the wheels square on the track.

Some of the cars have India rubber springs,
Patent lubricating boxes,
Patent soft metal bearings,
Safety beams in the truck frame, to hold it up if an axle breaks.
Improved brakes,
Changing backs to the seats,
Ventilators,
Draw spring couplings,
Patent car wheels,
And car bodies more than double or threefold the length of the body mentioned in Winans's patent, and about five times the length of the ordinary four-wheel car.

And no single improvement used at the present day owes its origin to the invention of Mr. Winans.

NO NEW PRINCIPLE.

The *validity of Winans's patent* depends upon his having *discovered and embodied*, and clearly claimed, *some new law or principle of mechanics*, as applied to the running gear, or else to some *peculiarity of construction* or arrangement not known before, and which is clearly distinguishable from what was known.

1st. Has he discovered any *new principle or law of mechanics* and *embodied it in some form*?

He has not; and this is evident from various considerations.

1st. The patent itself, which displays the philosophy of his invention, does not set forth any new principle, such as would have been claimed by the first inventor of a double truck swivelling car. For doubtless such a car does embrace and embody mechanical principles of action and construction and operation, taking the car as a whole, which are not embodied in a *four-wheel* car.

On the contrary, the patent admits the pre-existence of all the parts of the car, and of the same *general arrangement* of parts; but claims a peculiar arrangement of the wheels with each other, and a particular connection of the truck with the body.

2d. Many double truck swivelling eight-wheel cars having previously existed, which would answer, although perhaps less perfectly, the same purposes claimed to be answered by Winans's; every office that the said Winans's truck can be claimed by his counsel to perform, may be shown to have been performed by the trucks that preceded him.

To wit—the swivelling of the two trucks to the curves under one body, and the near and distant coupling of the wheels necessary to sustain the body, and to develop the swivelling principle with steadiness and ease of motion, to allow of a high speed.

These were in the Timber cars, the Wood cars, the Trussell cars, the Quincy cars, the Allen Steam Carriage and in the Columbus, in use in the United States, and are in the descriptions of Chapman and of Tredgold.

So far as any peculiar mechanical principle can be alleged to have been developed or embodied in Winans's car, those principles were not only already in use, but the rationale was already also made known to the world in the publications of Allen and Jervis, Chapman and Tredgold; so that for this reason, also, it cannot be pretended that Winans had discovered or made to the world in his specification any new principle or theory of mechanical philosophy, or had shown the application of any old or well-known principles in a new way. The fact that he is not able to make any clear and definitive distinction between what he claims as his, and what he admits was old, is itself evidence that there is nothing new in principle.

There is no language in his patent calculated to indicate the discovery or application of any thing new in principle; it all relates to mere alteration of proportions and arrangement, for the purpose of bettering a result already, to a considerable extent, allowed to have been attained in prior structures.

And although Winans's THEORY of making the axes of the wheels coincide as nearly as possible with the radii of the curves, was merely stating on paper what had been before reduced to practice, yet he may well have the credit of producing that *theory*, which is not itself the discovery of any mechanical principle, but is only an erroneous idea and mistaken application of the old and established principle of the swivelling trucks.

Suppose, for ARGUMENT'S SAKE, that Plaintiff had been the first to DISCOVER AND EMBODY the "SWIVELLING PRINCIPLE," PERHAPS he might have covered all similar PRACTICAL MODES of embodying the same principle.

But there is NO PRETENCE that Plaintiff first discovered this VITAL AND ESSENTIAL principle of the LONG-BODIED CAR.

The IDEA or principle that Plaintiff's counsel ALLEGE he discovered is, that in EIGHT-WHEEL CARS the trucks should be allowed to swivel ABSOLUTELY FREELY, by drawing by the body.

Now this is not a PRINCIPLE that Plaintiff DISCOVERS; it is not a *new idea;* but is a MERE mode of USING an old *invention of the swivelling truck in* ONE *way instead of another*, for the SAME PURPOSE.

It is *no more* the subject of a PATENT than it would be to draw a WAGON by the body instead of the shafts.

As *Judge Nelson* said in *Wilbur vs. Beecher*, p. 14,—" A person operating a combination already discovered, may, by experience in its practical use, see where it can be altered, and may call in a mechanic and have an alteration made which may improve *the machine.* This is a necessary consequence of the practical use of a machine by a man of ordinary skill and judgment, but there is no novelty or invention in such alterations."

As to the alleged NEW IDEA that the *trucks* would swivel more freely when the draft was through THE BODY, this is no new idea, as I have shown it had long before been embodied in various FOUR AND EIGHT-WHEEL CARRIAGES, and the whole philosophy of the subject explained, published and printed long before 1834. AND THAT such claim can form no part of Plaintiff's patent.

Suppose that Plaintiff had been the *first* to discover a theoretical idea that the trucks must be allowed to swivel with absolute freedom, and suppose that he had built a car accordingly and had put it into successful operation and then taken out the patent in the TERMS of Winans's patent, he could not, even then, PREVAIL IN THIS CASE.

1st. Because he has not described or set forth in any part of his specification any such IDEA OR PRINCIPLE.

2d. He HAS NOT claimed such an idea or principle in any form or shape, but has ONLY claimed a peculiar mode of *arranging the wheels and the swivelling connection.*

HE HAS NOT stated or claimed as any part of his invention, or as any part of his principle, the *mode of traction.*

3d. HE HAS stated one mode of traction, (substitution of ordinary perch bearing carriages,) which is absolutely inconsistent with any such *alleged idea or principle.*

4th. If Plaintiff were the *real* inventor of such *new idea,* HIS PATENT should be for a COMBINATION of the parts essential to the embodiment and practical development and use of that idea.

PATENTS for IMPROVEMENTS on MACHINERY must describe the parts or COMBINATIONS.

5th. Plaintiff must SURRENDER and get a RE-ISSUE, if such is the case.

TRUE PRINCIPLES OF THE EIGHT-WHEEL CAR.

What are the true mechanical principles of the construction and operation of the eight-wheel car?

All that is matter of *elemental principle*, as distinguishing the eight from the four wheel car, is the SWIVELLING PRINCIPLE.

The essential characteristics of construction and arrangement of the eight-wheel car are:—

1st. Two trucks under one body, the body to be of sufficient length to allow the trucks to swivel without collision against each other.

2d. The trucks should be placed far enough apart advantageously to support the body upon the trucks, it being generally found in practice expedient to place the bolsters about seven or eight feet from the end of the platform or bottom framing of the car body.

3d. The trucks themselves should have four wheels each.

4th. Held in rigid wheel frames that are well braced to keep them square.

5th. The wheels in each truck should be distant apart from centre to centre or between the bearing points about the same as the gauge or distance between the rails of the track, and form a square on the track from one bearing point to the other.

6th. The middle or centre of each truck must have a king, or SWIVELLING bolt connection with the body.

7th. And the body must have side bearings in the truck frame, to steady itself and prevent rocking when in motion.

The distance between the bearing points of the wheels on the rails is the essential and elemental feature. The distance between the flanges is not essential or material; but results from the diameter of the wheels and the distance between the bearing points on the rails.

It is the action of the bearing points of the wheels upon the track, and the reaction of the track upon those bearing points, which govern and control the motion of the car upon the rails.

As to the distance of the bearing points of the wheels upon the rails in each truck, it should be about as far apart as the gauge of the track.

1st. BECAUSE bringing the wheels nearer together can never be NECESSARY or useful, since no railroad is now built with curves so sharp as 1 *inch or* 1½ *inches* in 4½ to 5 feet; i. e., so as to use up all the play between flanges and rails.

2d. Bringing the *wheels* NEARER is followed by many unnecessary evils.

(*a.*) Both wheels are thrown up in too rapid succession by any inequality in track.

(*b.*) UNNECESSARY wrenching the rails by the re-action necessary to keep the truck in position on the rails, by LOSS OF LEVERAGE.

(*c.*) Consequent increase of tendency to fly off.

(*d.*) Extra *wear* and *tear* of flanges and rails.

(*e.*) Loss of *motive power* by INCREASE of *friction*, resulting from greater re-active force and *obliquity of truck*, or twisting of truck against the side of the rail.

(*f.*) Twisting of truck, increasing its tendency to catch at the junction of the rails, or at brakes, and consequent tendency to hop off.

The bearing points should NOT BE NEARER together than the width of the gauge of track,—i. e., the distance of centre of axes should equal the width of the track.

REASONS.

1st. The bearing points being not only equi-distant from each other, but being the four corners of an equi-lateral parallelogram, or square, of which the king-bolt is the centre, the action and re-action of the truck in any and every direction is equalized and balanced at the king-bolt, and thus the truck remains balanced and steady upon the track.

In other words, the mesne line of the action and re-action, (the resultant,) passes through the centre of the king-bolt.

If the bearing points were *nearer* together, this mesne line, or resultant, would pass *one side* of the king-bolt, CAUSING

(1.) An excessive friction of one *flange* against its rail.

(2.) Tendency to hop off, in consequence of the *angle of pressure* of flange against the rail being more *direct*.

2d REASON. (*Illustrated.*)

If a force of one pound tends to twist the truck round, then the RAIL must re-act and resist to the extent of one pound. If these forces are applied at EQUAL LEVERAGE,—equal advantage,—they will be equal. If not applied at EQUAL LEVERAGE, the want of leverage must be supplied by an increase of force.

The action of the flanges upon the rails, and the *re-action* of the rails upon the flanges, may philosophically be considered as FORCES applied upon *levers* whose fulcrum is the king-bolt. The *length of the levers* (at which those forces act, that tend to twist the truck off the track), is equal to half the width of the GAUGE.

If the bearing points are not equi-distant, the leverage (of those forces which twist the truck back into its proper position, viz., the re-action of the rail,) is LESS, and is equal to half the distance of the bearing points on one side of the truck from each other.

[Mr. Whiting then explained these ideas to the Court by aid of Models ; and then proceeded:—]

The FORCES may be considered as *delivering* themselves; one part on the line of the track, and the other part on a line across the track.

Some of the CONSEQUENCES of too close proximity of the BEARING *points* and loss of leverage, are,—

1st. Unnecessary stress on the *flange* of the front wheel while passing curves.

2d. Twist of truck and danger of hopping off track.

3d. Unnecessary friction and loss of power and wear and tear of rails, &c.

4th. Throwing up both wheels nearly simultaneously.

The bearing points of the wheels should be *as far apart as the nature of the curves will possibly allow*, because the farther they are apart the *less the truck can swivel* between the rails before it shall have exhausted all the play room or lee way between the flanges and the rails ; hence the wheels will always be kept more exactly in the line of their forward motion, more even and steady, and require less STRESS on the RAILS and FLANGES, less FRICTION, less LOSS OF POWER. **THESE ARE THE TRUE PRINCIPLES.** For a list of all our experts to this point, see "INFRINGEMENT."

OBJECTIONS TO OUR MODEL.

There were none made to it before Judge Conkling, on the former trial, and my colleague states that it was admitted to be correct in the Troy case.

The objections now made are:—

1st. That the springs are not straight, but that they are eliptical.

This is true, but they were like the springs in common use at the time, as is shown by all drawings.

There is no difference pointed out in the patent, between the straight and the curved springs.

There is no difference in the principle, and the only direction in the specification, is to have them *twice as strong* as those in common use, and short leaves on the *top* of the long ones.

All our experts say that this is what the patent describes, and the Plaintiff's witnesses do not deny it.

No model is produced by the Plaintiff, to illustrate his invention. It cannot be compared with any drawings of the original patent, if any existed, as he does not favor us with any here.

The difference of motion is extremely slight between the two forms of spring.

The Court will recollect Mr. Keller's argument to show that the centrifugal force of the cars, in passing curves, would throw the weight over upon the outward spring, and thus tend to cause the axes of the wheels more to conform to the radii of the curves, and so pass smoother along the track.

To accomplish this, the springs must be eliptic or curved; for, if the springs were straight and the ends fastened, the depression of them would bring the ends nearer together, and thus aggravate the difficulty, by bringing the axes ACROSS the radii.

The Court will perceive the morale with which the Plaintiff's case is prosecuted. He claims the *advantage peculiar* to that kind of spring, in one breath, to serve one purpose; and then, to serve another purpose, turns round and says that the model is erroneous, because it has that kind of springs!

The 2d objection is,—That the body is too narrow, and that it shows the bottom of the carriage below the tops of the wheels.

Answer. This is not material, as the trucks swivel all that is necessary.

It is only made to show the connection with the trucks. It allows of perfect swivelling, and that is all that is important.

It illustrates the peculiarities as to the arrangement of the wheels on the bearing carriages, and their connection by the king-bolt to the body.

No witness or expert objects to it, and, in fact, all our experts testify to the perniciousness of the invention from examining the PATENT itself and not the model; and if a structure is not an available one, it is no fault of ours.

3d. Then it is objected that the outside bearings are not shown in the model.

Answer. This makes no difference as to the arrangement of the wheels and their connection with the body, and it was unnecessary to show in the model that which is embodied in another patent, and which is no part of his claim in this. No person would have had a right to use them, if he had bought this patent right of Winans. Why, then, should our model incorporate that which is no part of his patent? It might as well embrace the brakes, and all the other apparatus connected with it, and with which he has no concern. The descriptions in the patent are inconsistent with allowing the side bearings on the outside of the wheels. He says, "Upon this first bolster I place another of equal strength, and connect the two together by a centre pin or bolt passing down through them, and allowing them to swivel, or turn upon each other, in the manner of the front bolster of a common road wagon." The bolsters of a common road wagon always swivel *inside* of the wheels, and the body is narrower than the distance of the wheels; and if *straight* springs were used, and these springs were bolted to *outside* bearings, the lower *bolster* would come between the flanges of the wheels, and thus prevent the wheels from being *very* close together.

We have not done the Plaintiff injustice, for both sorts of bearings are in use at this moment on the New York and Erie Railroad. See affidavits of Charles Minot, Defendants' No. 3,

p. 161, fol. 642; and John Murphy, No. 3, p. 11, fol. 43, where he says, "Eight-wheel cars with *inside* bearings and fixed boxes to the wheel frames and circular bearing and axis, are now in use on the Philadelphia and Norristown and Germantown Road;" so that both inside and outside bearings being in use at this time, the criticism is unfounded.

This very model was before the Court on the first and second hearings of this cause, and no objection has been raised to it heretofore.

No expert has objected to it—the objection is merely on the part of Counsel.

To the suggestion of Counsel, that the body is too narrow, and does not project over the wheels, I answer,

1st. It is not material, if the trucks swivel sufficiently to turn all curves.

2d. It is not the object to show any structure of body.

3d. If you use straight springs, as the Plaintiff demands, how are you to prevent the body from being below the wheels, unless you use enormous bolsters, and risk the structure breaking, in actual use, by straining the king-bolt.

It is a false charge to assert that our model was made for the purpose of distorting the proportions of the Plaintiff's invention.

WINANS'S THEORY.

The next topic to which we intend to call the attention of the Court, is the PATENTEE'S THEORY *of construction of the car, displayed in the specification; and we shall show it to be erroneous in mechanical principle, and pernicious in practice.*

The idea, that bringing the flanges of the wheels very near together, would cause the axles to coincide more nearly with the radii of the curves of the track—as a mere abstraction—is correct. It would be practically correct, if there were no play room between the flanges, and if the truck were never to be put in motion. But such is not the condition of the flanges and rails upon any railroad for public travel.

The peculiar construction of the elastic, or spring connection of the axis, allows them, while passing curves, to be *twisted* in a direction *transverse to the radii* of the curve, and so tends to cause the trucks to hop off the track.

The *same difficulty*, though to a less extent, attends the use of *any description* of truck frame, provided the axles are near together; so that these remarks are as applicable to the *common* bearing carriages used in 1834, and mentioned in Winans's patent, as a substitute for his spring trucks, as to the spring trucks themselves, since the spring trucks merely aggravate a difficulty which is inherent in the too close proximity of the wheels.

Inasmuch as lateral play is allowed between the flange and the rail, the nearer the axles are brought together the farther they may swivel in a direction across the radii; while, on the contrary, the farther apart the axles are placed on the truck, the less is the *space on a curve*, in which they can swivel between the rails; therefore the nearer do the axes at all times coincide with a perpendicular to the tangent of the curve at the bearing points. Therefore the more nearly parallel with the rails will be the line of forward motion of the wheels, and the more coincident with the radii of the curve will the axes be compelled to remain while in motion.

So true is Winans's theory on paper, and so untrue in practice, when the trucks are moving round a curve; and if he has any advantage in theory over the old-fashioned trucks of Chapman, Tredgold, or Quincy cars, or those of the Defendants, the mechanical defects of the structure he recommends, are such as to embrace all that is erroneous in the theory, without securing a single practical advantage.

The Plaintiff contends that it is best to bring the wheels as near as possible together, in each truck, because he imagines that friction is most avoided when you bring the wheels closest together, and that then the *least resistance* is offered by the *flanges to the guidance of the rails.* In other words, the nearer the truck can be made to act *like a single pair* of wheels, swivelling like a bolster of a road wagon, the better, as Winans thought.

This is all a FALLACY, founded in the mistake of carrying out a theory, that is well enough on paper, to a foolish extreme, so as to lead to error in practice.

1st. IN FACT, there is NO saving of friction in passing curves, such as now are allowed on railroads, by bringing the bearing points of the wheels nearer together than the width of the track. This has been demonstrated theoretically, and shown to be true in practice.

2d. If there is quite sufficient room for the wheels at *this distance apart* to pass along *the curve* without USING UP the play room between the rail and the flanges, there is no more friction of the flanges on the rail than if there were three or even five times the play room left.

If the flange is not compelled to *touch the rail at all*, (by reason of not occupying the play room,) that is the same in its effect, whether great or little SPARE room is left.

3d. If there be ANY PLAY room *left*, so as to allow the truck to pass AT ALL, then is LESS resistance made by the flange (*to the guidance of the rail*, in twisting the truck round,) the FARTHER APART the wheels are in the truck—because the action of the rail upon the flange is at a GREATER LEVERAGE, as above demonstrated.

4th. On the STRAIGHT track the friction is LESS, the steadier the forward MOTION of the TRUCK; and it is conceded, that the farther apart the *wheels are*, the steadier the motion, therefore the less the FRICTION on the STRAIGHT TRACK, which is 9-10ths of all railroads.

5th. But even on curves, the steadier the motion the less the friction, because the EXCESSIVE *play of the truck* brings the wheels at too great angles with the track, not only making extra friction, but danger of hopping off.

6th. The distance of the wheels is not to be adjusted SOLELY with regard to FRICTION, but other elements must be taken into view.

1st. SAFETY; that is, liability to run off the track.

2d. The action of the wheels on the rails, in wrenching them out of place.

3d. The *speed* must be considered—and the greater the speed the more DISTANT must the bearing points of the wheels be placed —(within the limits hereinbefore stated.)

4th. The friction.

5th. The span of rail or width of sleepers, and the distribution of WEIGHT on the road.

6th. The length of radii of curves, and various other elements not necessary now to be enumerated.

And it will be found, that NO *road* now exists, used for running at high speed, having curves 1½ inches in five feet of length.

And therefore it CAN NEVER be necessary to bring the axles of the wheels nearer together than the width of the track.

All the four-wheel cars and all locomotives have the large wheels much more distant (in reference to these bearing points) than the *gauge of the track*, and as THEY can pass all the curves and switches of our roads, of course other trucks with wheels still *nearer* than these, can, "*a fortiori*," do the same.

The fact that the outer front wheel in all cases MAY touch the inner side of the upper rail in passing curves, makes no difference, as this will happen, *however* near or distant you place the wheels, owing to the tendency of moving bodies to go in RIGHT LINES.

The only question is, *which is the easiest way* to turn the moving body *out of a right line* and into a *curve*,—by prying it round with a LONG LEVER, or a SHORT one?

It is another fallacy to suppose that the trucks will run BEST, that is, with least friction and most safety, when they *have the greatest freedom of swivelling motion.*

1st. The nearer the axes, the more they resemble a *single pair* of wheels, swivelling on a bolster.

Now such a pair of wheels have too great freedom of motion, wabble about too much; in passing curves, one wheel is pressed *back* too MUCH, so that the axis *cannot coincide* with the *radius of the curve it is passing*, but crosses it the wrong way.

All that makes it conform to the curve is the leverage of the rail applied to the UPPER wheel. The length of that leverage is equal to one half of the distance between the bearing points of the wheels on the rails, and the length of leverage of the lower wheel equals the *same* distance, the fulcrum being at the king-bolt.

One could DO NOTHING with such a pair of WHEELS, without a PERCH, or FILLS, as in common wagons.

It needs the action of the rail upon the REAR wheels to GUIDE the forward wheels of the truck; and the farther off you put the *controlling influence* of the rear wheels the better, because the greater the leverage.

Winans sets up NO SUCH THEORY as his *Counsel* set up, as to the GREAT IDEA of the patent depending on the car being drawn by the body.

THIS COURT entertained no SUCH idea in delivering the opinion we have heard read.

Winans's idea was *not to add* to the FREE SWIVELLING OF THE TRUCKS, as they always SWIVELLED freely enough BEFORE, but to DIMINISH FRICTION and make the AXES of the wheels coincide with the RADII of the curves they were passing, by BRINGING the WHEELS in *each truck close together*, and spreading the trucks far apart. AND HIS purpose would be accomplished as well when the draft was by trucks as by body; NAY, even BETTER, *in case* a SINGLE car is used ALONE.

It is only when drawn by the TRUCKS that the *forward* truck is *prevented* from the very DIFFICULTY of TOO much wabbling !*

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* A good illustration of the danger of placing the wheels too near together may be found in the trucks of locomotives. In order to preserve the wheels from collision, they are placed under the forward end of the frame, or engine. The wheels are made of small size, and placed near together, in order to accommodate them to other parts of the machinery; and to avoid *too great* LENGTH of the main springs which bear the weight of the engine. The size and position of the wheels result from a variety of compromises necessary in order to adjust the different parts to each other. If safety alone were considered, and if this truck had nothing different from the duties of a common car-truck to perform, and if the space were ample, the wheels would be placed as they are in the common car-trucks; that is to say, with axles as far apart as the gauge of the track. But as this has not been found practicable heretofore, without throwing too much weight on the forward truck, and encountering other difficulties well known to locomotive builders, they have made trucks to answer the purpose, retaining the wheels near together, but avoiding the danger of such a proximity of wheels, by an arrangement of the parts entirely different from what is claimed in Winans's patent. In Winans's, the *whole weight* is borne upon *the centre* of THE BOLSTER, (as has already been shown,) and not upon ANY *side bearings*. The locomotives have NO BOLSTERS, and bear NO WEIGHT upon the *centre of the frame*, at or near the king-bolt.

All the weight of the front end of the locomotive is borne upon SIDE BEARINGS.

WINANS'S truck is made by uniting the axles by means of long springs, bolted to boxes which rest on the journals; preventing the springs from acting except by opening or closing the wheels on one side or the other of

Such were *Winans's theories*, and so were they founded in ERROR.

Leaving the REAR TRUCK IN DANGER, unless coupled with the forward truck, and at a great DISADVANTAGE, and the *forward truck* safe only when guided and drawn by the PERCH.

And as SOON as speed of railway travelling INCREASED, the very first change necessary to be made was to DEPART still farther from Winans's theory, and SPREAD THE WHEELS *farther apart*, otherwise they could not be trusted SOLELY to the guidance of the rails:

So different was Winans's notion from what his Counsel have stated!

Now if the arrangement of wheels, and their connection with

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the truck. The locomotive spring is not *connected* in any way with the axles of the wheels; but is allowed to expand or contract freely in cast iron pockets; and is confined by a saddle, so that the motion of the springs is entirely independent of the axles; and the axles are held firmly, and the wheels square upon the track by a rigid wrought iron frame. To avoid accidents, and to prevent the trucks from swivelling too far, and from too great zig-zag motion, they have four strong chains fastened from the four corners of the truck to the body of the locomotive. These chains are made of such a length that the truck cannot swivel round so far as to allow the flanges to cross the rail; and also so as to hold up the locomotive in case of breaking one of the wheels.

The action of this truck is also modified, and in some degree controlled, by the driving wheels, which are intended to bear the larger part of the weight of the locomotive. Sometimes only one of the drivers has a flange; sometimes both. In either case the drivers, being *not* in any swivelling truck, (as *Allen's* were,) but being permanently connected with the body of the engine, modify, and to some extent control the action of the truck, and require it to act very differently from what would be the case were *two swivelling trucks* to be placed under the locomotive. The motion of the forward truck is thus made more steady than it would be if left to itself,—so that the truck of a locomotive is far from being, in any respect, like that recommended by Winans for a freight or passenger car, either in its *structure, uses, controlling influences, checks and safeguards*, or *modes of operation.*

The locomotive builders are now beginning to remedy this defect, by arranging the machinery so as to allow them to place the wheels farther apart, and thus approximating the true principle of the truck, as established by Chapman, Tredgold, Allen, Bryant and others. In some of the most recent engines the bearing points of the wheels are *more* distant from each other than the *gauge of the track.* And it is found that the change causes the engine to run more steadily and smoothly upon the track.

the body is made in the manner *particularly recommended by Winans*, the car is DANGEROUS, and UNFIT FOR USE, as stated by Mr. WATERMAN.

See his affidavit, Defendants' No. 3, p. 65, and there the Court will find five specific objections to the use of the railroad truck as described by Winans, whether you use it with or without the spring.

And your Honor will see that he, in common with many other scientific experts, condemns the use of the truck, not only by reason of the peculiar structure of the springs and bolsters described in the patent; but because the trucks (which, as the Patentee says might be substituted for these,) also had the fatal defect of *placing the wheels too close together.*

The other experts show that there is an inherent difficulty in the theory of making the axes of the wheels coincide as nearly as possible with the radii of the curves.

Henry Waterman, p. 65, No. 3, says:

"*A car constructed as described by Ross Winans cannot be used with safety for general running* on a railroad at an ordinary velocity, such as aimed at by his specification, say at fifteen or twenty miles an hour. His car, as described by his specification, is too dangerous to use on a railroad, both to life and property, for the following reasons:

1st. *The metal composing the springs that connect the wheels is liable to constant depreciation of strength by its vibration,* and is so liable to break that it could not be relied upon, and such a break in that truck would certainly do great injury, and probably destroy the life of some of the passengers.

2d. *The next reason is,* that these *spring trucks will not keep square,* but lose their rectangular form by the transverse pressure, which will cause the truck to run off the track.

3d. *Another reason is,* that this *construction and nature of the truck, when attempting to run on a curve of the road,* where necessarily the outer wheels have the longest distance to traverse, and bear hardest against the side of the outer rail, *allows the axles of the wheels to get out of parallelism with the radii of the curve,* by the inner wheels forcing themselves forward of the outer wheels, twisting the truck out of rectangular shape, and necessarily run off the track. It is the worst form of truck that I have ever seen devised.

4th. *Another reason why it is dangerous* also, is that *the vibration of the springs* will allow *the axles to get out of parallelism* with each other, which adds to its dangerous character before explained.

5th. *The very close proximity* of the wheels required by the Winans specification, is also *erroneous in principle* and practice, as it allows a serpentine, unsteady and unsafe motion, both horizontally and vertically; and the wheels follow each other in shocks on the same inequality on the rail, so quickly as to blend the shocks so much together as to become like the action of a single wheel, with a single shock, without giving the front wheels a chance to recover before the next one strikes, and causes the wheels by the concussion and the action of the springs, to hop from the rail, and thus run off from the track from this cause, or become dangerous; these inequalities are frequent at the joints of the rails. It is the worst plan for a truck, and all of these causes combined, constitute the very great danger and destructive character. I have, *in practice, proved these principles and actions as stated, to be correct.* The proper mode of constructing the trucks of eight-wheeled passenger cars, and that in general use, is to have a rigid rectangular wooden or iron wheel frame with pedestals securely attached to it, to insure a normal action of the wheels on the track, and hold the axles exactly parallel to each other, and parallel to the radii of the curves, and the wheels in each truck should be about 55 inches apart from centre to centre or between the bearing points of the wheels on the rails, that is, between 54 and 57 inches, with wheels varying from 30 to 33 and 36 inches diameter, which are the sizes in common use. This construction of truck runs with ease on both the straight and curved lines of the road, and with perfect safety, in the principles and action of the wheels, on the rails, at all rates of speed."

We produce the united testimony of *thirty-three men of science, consisting of practical car builders, civil and mechanical engineers, railroad machinists and superintendents,* and persons whose profession has led them to the most intimate acquaintance with this subject. With ONE VOICE they say that the railroad car, as arranged and described by Winans, *is not practical or useful*, but erroneous in the principles of its construction; and dangerous in practice. I will give their names:

The Plaintiff produces only Elgar and Hibbard on this POINT, neither having any PRACTICAL KNOWLEDGE on this subject. *Thirty-three witnesses against two!*

If it be said that some of these witnesses have formerly stated, as Mr. LEE has, that many cars, built according to Winans's patent, were in use in all parts of the country, and that this shows that they are in error, we reply that they were led into that error by the shrewd manner in which the Plaintiff states his claim, which was supposed by them to cover the SWIVELLING PRINCIPLE.

The witnesses on the part of the Defendants, to whom I have referred, are:

1.	Henry Waterman,	Defendants'	No. 3, p.	65.
2.	William T. Ragland,	“	“	67.
3.	George Stark,	“	“	70.
4.	George W. Smith,	“	“	82.
5.	Charles B. Stuart,	“	“	90.
6.	William J. McAlpine,	“	“	93.
7.	Vincent Blackburn,	“	“	96—7.
3.	Walter McQueen,	“	“	103.
9.	George S. Griggs,	“	“	110.
10.	William Raymond Lee,	“	“	111.
11.	Albert S. Adams,	“	“	114.
12.	James H. Anderson,	“	“	118.
13.	Jno. B. Winslow,	“	“	121.
14.	Asahel Durgan,	“	“	124.
15.	Jno. Crombie,	“	“	126.
16.	H. W. Farley,	“	“	129.
17.	Robert Higham,	“	“	133.
18.	Albert Bridges,	“	“	135.
19.	Jeremiah Van Rensselaer,	“	“	137.
20.	Isaac Adams,	“	“	139.
21.	W. C. Young,	“	“	150.
22.	W. P. Parrott,	“	“	153—4.

23.	M. W. Baldwin,	Defendants'	No. 4, p.	4.
24.	Richard French,	“	“	5.
25.	Henry Shultz,	“	“	44.
26.	Wm. B. Aitken,	“	“ 3,	31.
27.	Jacob Shryack,	“	“ “	40.
28.	Godfrey B. King,	“	“ 4,	81.
29.	Stephen Ustick,			
30.	Oliver Byrne,			
31.	Edward Martin,			
32.	Stephen W. Worden,	“	“ 2,	39.
33.	Henry Shultz.	“	“ 3,	44.

Now there are the names of thirty-three men of science, and of practical knowledge of railroads, who inform this Court, that the invention as described in Winans's patent is of no practical utility, but dangerous and pernicious.

I ask the gentlemen on the opposite side to find a single car, built in actual conformity to Winans's plan, in existence. I know they tell us that his cars are scattered all over the country, but this assertion *assumes the point in controversy*. There is undoubedly a vague presumption and hollow pretence by the Plaintiff, that many and most of the cars in the United States are on his plan; but where is one to be found in use, actually embodying his *peculiar devices?* Not one car has been proved to have been built, whose dimensions, proportions and parts really correspond with the patent.

In fact, the car of Winans's was actually tried on the Baltimore and Ohio Railroad and CONDEMNED. See

Jacob Shryack,	Defendants'	No. 3,	p. 40.
Stephen W. Worden,	“	“ 2,	39.
Henry Shultz,	“	“ 3,	44.

No railroad has now in use trucks under the cars, with wheels having their flanges “as near as may be without touching.” No such principle is allowed; we produce an overwhelming weight of testimony to the contrary, viz.:—

1st. See Walter McQueen; Defendants' No. 3, p. 100, for the fact *that the Defendants have the axes of the wheels at a distance apart about equal to the breadth of the track.*

2d. Septimus Norris, one of the most eminent car-builders in any part of the country, Defendants' No 3, p. 4.

3d. Richard French, Defendants' No. 3, p. 5, and who altered the car "Victory."

4th. Henry Shultz, Defendants' No. 3, p. 44, who places them as far apart as he can get them in a truck which is from seven and a half to eight feet long, on the Philadelphia, Wilmington and Baltimore Railroad.

5th. Waldo Higginson, Defendants' No. 3, p. 83, an engineer on the Boston and Lowell Road, an educated gentleman whom I know personally to be a man of high character and of accurate and practical mind.

6th. W. T. Ragland, Defendants' No. 3, p. 68, who states that the distances at which he places the axes apart is 54, 55, and 56 inches, in bearing trucks, and *which distances, he says, are generally adopted.*

7th. George Stark, Defendants' No. 3, p. 70.

8th. Vincent Blackburn, Defendants' No. 3, p. 96.

9th. George S. Griggs, Defendants' No. 3, p. 104, who places the distance between the flanges at twenty-seven inches.

10th. Wm. R. Lee, Defendants' No. 3, p. 110.

11th. Albert S. Adams, Defendants' No. 3, p. 114, who states that the best arrangement is, to place them as far distant as the square of the track.

12th. J. H. Anderson, Defendants' No. 3, p. 117, who says that on the Providence and Stonington Road, they are placed apart a little more than the breadth of the track.

13th. J. B. Winslow, Defendants' No. 3, p. 20, who states that the axes are as far apart as the gauge of the track.

14th & 15th. Asahal Durgan and Henry W. Farley, Defendants' No. 3, pp. 123 and 129, state that the bearing points of the wheels should be as far apart as the gauge of the track.

16th. John Crombie, Defendants' No. 3, p. 125.

17th. Davenport and Bridges, Defendants' No. 3, p. 135.

18th. George Beach, Defendants' No. 2, p. 56.

19th. L. R. Sargent, who says that the flanges are generally from twenty to twenty-seven inches apart, Defendants' No. 2, p. 41.

Now who can say, (after we have brought the most eminent engineers in the country here, unless they are, as Mr. Keller has boldly charged, a set of perjured men,) that there is any pretence that the modern railroad cars incorporate the principle of bringing the axes of the wheels as close together as may be, to make them coincide with the radii of the curves?

From the foregoing it clearly appears:—

1st. That the Plaintiff was not the first and original inventor of *the arrangement of the running gear* of the eight-wheel cars as *built by the Defendants*, nor of any part or combination thereof, and this results from our examination of prior inventions.

2d. That the eight-wheel car grew gradually out of the necessities of railroads in their earliest periods of construction, and was suggested to, and built by those, who were earlier on the ground than Winans, to whom the railroads owe absolutely nothing.

3d. That Winans was not the inventor of the Columbus; but that whether he was, or was not, if the car itself ever existed, Winans's patent is void.

4th. That Winans was not the first inventor, nor *an* inventor of any new principle, applied in any way, but borrowed the philosophy of his specification from Tredgold, Allen, Jervis and others.

5th. We have shown what in reality are the true principles of the eight-wheel car; and,

6th. The erroneous principles adopted by Winans in his theory, and their utter failure in practice.

7th. I will merely add, that Winans seems to have drawn his specification so skilfully as to have entirely misled the public as to the real nature and extent of his claims.

INFRINGEMENT.

Having now shown what Winans's claim really is, so far as the patent can be considered valid and the extension legal, (*See Construction*, p. 40,) I now proceed to show that *the Defendants have not infringed upon the Plaintiff's rights, whatever construction shall be given to the Letters Patent.*

There is, it is true, one construction upon which all the world would be infringers; that is, if Winans has the *exclusive* right to build and use every sort of eight-wheel cars, with *two swivelling trucks*:—and this construction, which is now admitted to be erroneous, was at one time supposed to be the true one by some of the Defendants' experts, who, upon THAT mistaken hypothesis, stated that the cars in general use were substantially the same as described by Winans's patent.

But as this construction would include the Chapman, Tredgold, Quincy, Baltimore Timber cars, Wood cars, Trussell cars, Allen's steam carriage, Columbus, Fairlamb, Jervis, the Dromedary, Winchester, Comet and Victory, &c., &c., the patent would be void, as embracing claims far broader than the invention; and the Plaintiff having filed no disclaimer, could not recover at law, nor have any injunction. (See Chief Justice Taney's opinion, Plaintiff's proofs, p. 21, Art. 3.)

Under any other reasonable construction the Defendants do not infringe.

What proof of infringement has the Plaintiff offered? On whom does it rest? What disinterested party has sworn it? Who has averred that the cars manufactured by the Defendants are substantially the same thing as the patent describes?

No man has said it, except CHARLES D. GOULD.

Is Mr. Gould a disinterested party?

Is he an expert, or is his opinion to weigh against that of a large number of the most scientific and practical men in the country?

How do the Plaintiff's witnesses discriminate between the Winans arrangement and the older cars? What do they rely upon, as showing a substantial difference, so as to maintain Winans on the question of novelty?

The Plaintiff's counsel say that the difference consists in the drawing by the body. If this be all that distinguishes the Plaintiff's from prior inventions, then the Plaintiff's case fails, because the patent makes no such claim. But, if his patent cover the things described in his claim, and no more, the evidence is conclusive that we do not infringe; and the evidence is also conclusive, that whatever the Plaintiff claims, the *Defendants use only that which was known and used prior to Winans.*

The testimony of the following witnesses clearly proves *that* WINANS'S "*mode of arranging the wheels, and connecting them with the body,*" *is impracticable and dangerous; and is entirely and essentially different from that which is used by Defendants*, and which is in general use in the country.

In other words, there is no infringement of the Plaintiff's claim.

1.	Charles B. Stuart,	Defendants'	No. 3,	p.	90.
2.	George W. Smith,	"	"	"	82.
3.	W. T. Ragland,	"	"	"	68.
4.	Henry Waterman,	"	"	"	65.
5.	Jacob Shryack,	"	"	"	40.
6.	William J. McAlpine,	"	"	"	93.
7.	Vincent Blackburn,	"	"	"	96–7.
8.	Walter McQueen,	"	"	"	103.
9.	George S. Griggs,	"	"	"	110.
10.	Albert S. Adams,	"	"	"	114.
11.	James H. Anderson,	"	"	"	118.
12.	John B. Winslow,	"	"	"	121.
13.	Asahel Durgan,	"	"	"	124.
14.	John Crombie,	"	"	"	126.
15.	Henry W. Farley,	"	"	"	129.
16.	Robert Higham, (2d affidavit,)	"	"	"	133.
17.	Albert Bridges, (2d affidavit,)	"	"	"	135.
18.	Jeremiah Van Rensselaer,	"	"		136–7.
19.	Isaac Adams, (2d affidavit,)	"	"	"	139.
20.	William C. Young,	"	"	"	150.
21.	William P. Parrott,	"	"		153–4.
22.	Richard French,	"	No. 4,	"	6.

I pause for a moment in this argument, as I recall to mind an attack made by the able counsel who opened the cause, upon five gentlemen, of whom some are known personally to me.

It has been asserted that "they held their oaths so loosely, that they can one day come into Court and swear one thing, and on the next day another."

In explanation of the testimony of these witnesses, it is only necessary to say to your Honor, that in their first affidavits they have shown that they supposed Winans's claim covered all swivelling cars, and that the Defendants' cars (being swivelling cars,) were substantially like those claimed by the Plaintiff, merely because they were SWIVELLING cars, and for no other reason.

Afterwards, in a further examination of the patent, and, perhaps, learning from the opinion of the Judges of the Supreme Court of the United States, that Winans's claim did not cover *every description* of *swivelling* car, they stated that they were mistaken in their first affidavits in supposing that Winans's claim covered ALL SWIVELLING TRUCKS; and perceiving this error, they at once saw that the Defendants were not infringers upon the Plaintiff, because they did not USE THAT which was claimed by Winans, as distinguishing his improvement from what was known and in use before his day.

And it is a painful thing to one who entertains the sentiments which I cherish towards some of those gentlemen, to listen in silence, at this distance from their home and from mine, to so extraordinary and so bitter an attack upon their character, made only because they have seen fit to do justice to your Honor, to themselves and to the Defendants, by correcting an error into which they were inadvertently led by the loose and artful terms in which the patent of the Plaintiff was couched. But I should be no less forgetful of their dignity than of that respect which is due to this Court and to myself, if I condescend to defend them from such a charge.

Mr. Keller says, "that the affidavits all state that the Tredgold, Chapman, and other cars were the *same* as Winans's; and yet that the Defendants do not infringe."

This, Sir, is a most erroneous conception of the testimony.

The Defendants' experts swear that Tredgold, Chapman, Allen, Quincy and other cars contain the GENERAL construction and mode of operation, (that is, the principle) of the eight-wheel cars now in common use; that so far as Winans embodies the same principles, they are all alike, and substantially the same as Winans's.

That *that which distinguishes* Winans's from these preceding inventions, is *not* found in the cars in common use, nor in those built by the Defendants, but they have availed themselves only of what was well known prior to the patent, with such changes of proportion and improvements as they had a right to adopt, not one of which was invented or claimed by the patentee.

Mr. Keller, by his observation, shows that he had wholly misapprehended the true nature of our defence.

Proceeding with the argument, I ask, what expert in the United States has come forward, and stated that the cars, made and used by the Defendants, are in fact upon the same principle, and substantially the same car as is described in the Plaintiff's patent ?

I answer—that excepting Gould, not one! and, what is more singular, even Winans himself has not said so. He does not dare to come into this court and make that allegation upon the record.

He has made his bill of complaint, and sworn to it.

He has made his affidavit, which is a long one and embraces many topics, and has sworn to it. He has had the aid of Counsel not surpassed in ability by any that the country affords; and, Sir, —with their advice, perhaps, or without it—he has not ventured to come before your Honor, on his solemn oath, and state that the Defendants, in their cars, embody one particle of the invention of which he was the author.

And it is one of the most remarkable circumstances that I have ever known in a patent case, that a party should come into a Court of Equity, and attempt to prove an infringement by such testimony as has here been presented; the Plaintiff himself daring not to allege it, and finding but one gentleman—(proved to be interested in this suit and in the patent, and who ought therefore to be a party to the record)—who states that cars, *substantially* like the Plaintiff's, have been built by the Defendants. And Mr. Gould, after all, only asserts what is *his opinion;* and Mr. Winans only swears that he has been *informed by Mr. Gould* that Defendants' cars are substantially like what are described in his patent! Has not Winans seen Defendants' cars? Then why does he not swear of his own knowledge, instead of swearing upon the information of Gould, who is no mechanical expert, and not legally qualified to pronounce an opinion on any such question in a court of justice ?

These two gentlemen's opinions are to be put into the balance against those of many disinterested practical engineers.

Now, Sir, if you choose to examine for yourself, trusting no person, either on one side or the other; if you take the model of the car built by the Defendants, and set it by the side of a true and just model of the car built by Winans, I ask your Honor to tell me whether they are substantially the same, or not, in *those parts in which Winans differs from those who went before him?* Examine the car made by the Defendants, as to its proportions, arrangement and details of construction, and make the comparison.

The length of the body is generally now about fifty to sixty feet, five times to six times as long as the old four-wheel car, and twice or thrice as long as Winans recommends.

The distance of the wheels in each truck, or of the flanges, apart, is from twenty to twenty-five inches. (See George Beach's affidavit, p. 38, Defendants' No. 2.)

On the Hudson River Railroad, the average speed is from thirty-five to forty miles per hour, and in the cars that run on that road, the flanges are far from being "as near as may be" without touching. They are farther apart than they were in the trucks mentioned as in common use in the patent itself, viz., three and a half feet from centre to centre, and this was a greater distance than had frequently been used on the Baltimore and Ohio Railroad before 1830. Now three and a half feet from centre to centre of the axles, is forty-two inches; and the size of the wheel being at least eighteen inches in diameter, would bring the flanges within six inches of each other on that class of trucks which were built with wheels of these dimensions; yet Winans proposes to bring them still nearer. The *Defendants never brought the flanges so near* as they were in these old-fashioned bearing carriages, but they place them about *two feet apart*, and always far enough apart to admit of a brake being placed between them.

As to the springs; the Plaintiff admits, that they were in use before his invention, and he does not claim them. He states that he prefers his long spring, twice as strong as the common spring on the four-wheel car, to the old way of giving one spring to each wheel. The Defendants prefer the old-fashioned way of applying one spring to each wheel in both trucks, as Mr. Allen did in 1830, as shown in his drawings and model; and as was done by many others.

The Plaintiff prefers to have the bolster swivel on a centre pin, or king-bolt, like the common road-wagon, without side-bearings; but the Defendants prefer side-bearings, as in the Quincy car and Allen engine, &c., and a transom-plate, being Imlay's patent, or what is commonly called so.

The Plaintiff prefers to fasten his body on to a bolster, and abandons the swinging thorough-braces of the old Columbus, and trusts for his ease of motion solely to the elasticity of those springs, which, by their action, will throw the truck off the track. The Defendants prefer the swinging bolster, which is an admirable way to provide for easy lateral as well as perpendicular motion.

The Plaintiff, as before stated, gives no direction or description as to how the car is to be drawn, whether by the perch or by the body. His drawing, annexed to the patent in 1837 or 1838, is out of the question. He makes no claim to any mode of traction, and he has no reason for making any. The Defendants draw by the body, but they also have an apparatus called a spring-coupling, which does not draw by the ENDS OF THE BODY, but from a fixed point some feet distant therefrom, in order that the line of traction may more nearly coincide with the line of the track. This answers Mr. Keller's objections to coupling the ENDS together.

The Plaintiff prefers connecting the axles of his wheels by a spring twice as strong as usual in the four-wheel car, because the body is twice as long, and is to carry twice the load. The Defendants prefer the old-fashioned rigid rectangular wheel-frame, as the mode of connecting their wheels together on trucks.

The Plaintiff prefers to have the bearing points of the wheels in each truck as near as possible, and far less distant than the gauge of the track. The Defendants prefer them usually of the width of the track; while on the swiftest trains and on roads with the smallest curves, they make them as wide as the curves will allow, which is sometimes six feet apart, after the old fashioned cars of Chapman, Tredgold, Allen, Quincy car, &c.

The Plaintiff prefers that the action of each truck shall, as nearly as possible, resemble the action of a single pair of wheels, by means of the approximate coincidence of the axles with the radii of the curves of the track. The Defendants try to get as far as possible from that, and to separate the axles as far apart as may be consistently with preserving sufficient play room between the flanges and the rails when passing curves.

The Plaintiff prefers placing his truck *at the ends* of the body,—as in the Quincy car,—(or beyond it, as nobody ever did but himself,) or near the end, and never farther under the end than is necessary to protect the wheels from collision, (as in the Columbus, in which the centres of the trucks were *five feet* from the ends of the body.) But the Defendants prefer putting their trucks at least *seven feet* from the ends of the platform.

If the Plaintiff's claim is for a combination of old parts, which he says is to produce an old or new effect, what are the parts he claims to combine?

Are they the body, the trucks, the wheels, the springs, &c.?

All these have been combined in every eight-wheel double truck swivelling car before.

If the Plaintiff claims that combination of these parts which distinguishes *his* arrangement from all others, then what are the parts or elements of his combination, considered as a combination? They are

1st. The body.

2d. A swivelling truck of peculiar structure, with long springs.

3d. A wagon bolster, bearing the load on its CENTRE, and with no side bearings.

The Defendants use no such combination. What is *peculiar to Winans* they never use; but they fall back upon the old and superior combination, which Winans in vain endeavored to improve upon.

If the Plaintiff says that his claim is for connecting the body with the trucks, by a *swivelling pin or king-bolt*, then his patent is void, because he did not invent it and does *not* claim it.

If he claim a patent for putting the flanges nearer together than before, and making the body about twice as long as the four-wheel cars, whereby the trucks go farther apart, the Defendants reply, 1st. That the Plaintiff has brought his wheels no nearer than they were in the OLD PRECEDING cars.

2d. That he made his body no longer than the Trussell cars, the Wood cars, &c.

3d. That if he did this, it is a mere change of proportion, as the flanges approach nearer by merely increasing the size of the wheels.

4th. That the Defendants do not employ either of the Plaintiff's proportions, but *place their flanges as far apart, and even farther, than in the old cars*, and their body is *five or six times as long* as the old four-wheel cars; and that if such change of proportions gives any right to a patent, the Defendants have as good a right to a patent for cars sixty feet long, as Winans has for a car twenty feet long.

That if Winans's claim is construed as we have already shown it should be, (see p. 40,) there is no pretence that we have infringed either the wagon bolster, or the spring truck, or that we have stolen or applied the philosophy,—shown to be false,—of making any truck that will act like a single pair of wheels, or that the Defendants have fallen into the error of adopting Winans's theory of attempting to make the axes of the wheels coincide as nearly as possible with the radii of the curves of the road, by the near proximity of the wheels.

The Defendants have not abandoned the safe and well-tried mode of connecting the trucks with the body by means of the old-fashioned king-bolt, or transom, with side bearings, and have not approved of or adopted the Plaintiff's wagon bolster, with the weight of the car borne upon the CENTRE thereof.

The Defendants have not adopted the rickety, twisting, dangerous *spring truck* of Winans, but have continued the use of the old solid square wheel frames; and instead of trusting the safety of their truck to the strength of a long single spring, and using that as one side of the wheel-frame, which, in case of breaking, will inevitably let the car body on to the wheels, and thus cause destruction, the Defendants have used a solid wheel frame, independent of and in addition to the springs; and so that in case these springs break, no damage to the body need follow, and so that the wheels may be kept *square on the track.*

The Defendants have not adopted the near proximity of the wheels in each truck; but have kept the axes equi-distant with the width of the track, as did Tredgold, Chapman, Quincy cars and others. They have indeed put their trucks under the body a few feet from the end, as there was no other place where they could be put in order to support the body of the car; but they have not placed the trucks so near the ends of the body as the Quincy car.

If, then, (as we have shown before,) Winans has discovered nothing new *in mechanical principle*, nor any thing new in *mechanical philosophy*, but has only arranged the same parts before known, in a manner very similar, if not exactly the same as had been before done, his patent can only be for that arrangement which is substantially different from that which had been before made and *that which is peculiar to him, in contra-distinction from what was used before.* In considering what is peculiar to him, we must take the whole machine together as an organization. The connection of the wheels by springs, the near approach of the axles, so as to make them approximate the action of one wheel, the suspension of the load in the centre of the bolster without side bearings, *are all elements essential* in themselves *and peculiar* to him, introducing a great difference into the action of the truck frame from what had before been found practically useful, and from what is now used by the Defendants or by any one else.

And *the near juxta-position of the wheels* in one truck, and the *remote coupling of the trucks, are not alone considered the embodiment of what is peculiar to Winans.* These features, *alone considered*, are *mere changes of proportion*, and, therefore, not patentable. No one violates his patent who does not *combine all that is substantial* in the organization which is peculiar to Winans, even if Winans be the first inventor of it. Therefore, if the Defendants did *place or arrange their wheels as the Plaintiff placed or arranged them*, (which they do not do,) *this would be no infringement*, because this would not be taking all the essential parts, devices or elements of Winans's arrangement or combination *as he claims them;* since he does *not claim* the arrangement of the eight-wheels with respect *merely to their position relatively to each other*, but with reference to the *means by which that ar-*

rangement is carried into effect; he does not claim the connection of the truck with the body by a swivelling king-bolt, *abstractly, but with reference to the peculiar devices by which that connection is produced.*

If Winans has attempted to secure a patent for all modes of carrying freight or passengers smoothly and evenly over the curves and inequalities of the road, by means of the eight-wheel swivelling car, he has attempted to patent a result,—not a machine,—and such a patent could not be sustained for the following reasons:—

1st. It is against settled principles of the patent law to patent a RESULT.

2d. The result is not new, even if he could accomplish that result better than others.

3d. The Defendants accomplish it infinitely better than Winans,—if Winans ever accomplished any,—so that the Defendants are as far beyond Winans, as Winans was beyond the four-wheel car.

4. Mere difference in degrees, consequent upon change of proportions, is not the subject of a patent.

If Winans claim that he discovered a new principle in mechanics, and embodied it in some form in his eight-wheel car, and therefore claims a patent for his car, and all others involving the same principles—we reply,

1st. That he has discovered no principle that was not already known, printed, and practically embodied in all the swivelling cars.

2d. That he has not explained, or *claimed* in his patent, to be the discoverer of any new principle, and there are no words to that effect therein.

3d. That mere abstract principle could not be claimed and secured.

4th. That if machines are within his principle only when they can be clearly distinguished from the Quincy and Allen, wood and trussell cars, Chapman, Tredgold, &c., then the Defendants have not infringed, because Winans is on one side of all of them, and the Defendants are on the other; and the Plaintiff cannot claim novelty, without admitting that the Defendants do not infringe.

In fact, the Defendants may be said to use the Allen steam carriage, *with a box for passengers;* or the Chapman or the Tredgold, *with large wheels and a longer body*, while the bearing points of the wheels remain the same, or the Wood and Trussell cars, *with a box for passengers*, if passengers are required to be carried; but the wheels in each truck are not so near together, and the two trucks not so near the ends of the body,—

Or the Defendants may also be said to use the Quincy car, with a *box for passengers*, if they require to be carried, and with the *wheels larger*, and *the body longer*.

I have before mentioned that Winans's car was for freight as well as for passengers, as the specification and drawing show.

And as the *only real principle which distinguishes the eight-wheel from the four-wheel car, is the swivelling principle*, that being attained, all other arrangements *are mere alterations of peculiar devices, or parts or proportions*. And as the Defendants do not use Winans's peculiar devices, parts or proportions, it is self-evident that they do not infringe.

Mr. Keller admits, that the Defendants do not infringe, if they combine in their car every thing else described by the Patentee, except drawing by the body; and that if they were to draw by the perch, there would be no infringement. Id est: *we may use every thing described and claimed in the patent and drawing, without infringing*, and we become infringers only when we use that which is neither described nor claimed in the patent!

The Plaintiff wants an injunction to stop all the railroads in the country from using something which is not thus described or claimed; and which, we have shown, was no more the invention of Winans than the old Chapman, Tredgold and Quincy cars, whose principles of construction and operation have been so closely followed by the Defendants.

Is not this ridiculous in the extreme; and is it not trifling with courts of justice?

It is the settled rule of this Court to refuse to interfere by injunction, where the right of the complainant is in any degree doubtful or disputable; on which point I refer to the following cases:

Hart vs. Albany, 3 Paige, 213.
Steamboat vs. Livingston, 3 Cow. 713.
Collard vs. Allison, 4 —— & Cresswell, 487.
Same case in Hindmarch, 315.
Boothe vs. Garely, 6 vol. Leg. Obs. 99.
Isaacs vs. Cooper, 4 Wash. C. C. R. 259.
Molly vs. Dowman, do. p. 1–14.
Barnwell vs. Malcomb, 3 Mylne & Cr. 738.

Now can the Court hesitate for a moment to decide that the rights of the Plaintiff are extremely doubtful, to say the least?

Sir, I consider this trial to be a desperate effort to compromit the judgment of this Court, in order to pave the way for an Injunction against the Railroad Companies of New York. The unusual number of the Counsel on the other side and their extraordinary zeal, show that such is the fact. Will this Court take upon itself the task of finally settling upon *ex-parte affidavits*, such questions as these—Whether or not Ross Winans allowed what he claims as his invention to go into public use before his patent?

Whether he has not led the Defendants to appropriate what he claims as his invention to their use, IF THEY HAVE DONE SO, by *his own conduct?*

Whether the Wood and Trussell and the other cars, that I have mentioned so frequently, existed before the Columbus; and whether the Plaintiff or Gatch was the inventor of the Columbus?

Whether the thirty-three gentlemen, connected by their profession with the actual operation of railroads, who swear that, according to their experience, the invention claimed by Winans is IMPRACTICABLE and DANGEROUS, and thus worse than useless, are mistaken?

Whether the Quincy car, the Chapman or the Tredgold cars, do or do not embody all that the Defandants use?

Whether the thirty-three men of scientific and practical knowledge, (*standing at the head of their profession,*) who deny that there is any infringement, are right; or is Hibbard (the only witness against them) mistaken?

Whether the *prior inventions*, now for the first time proved in Court, do or do not embody *all that is essential* in the organization of the eight-wheel car, as made by the Defendants, excepting those *devices* which are *peculiar to Winans*, and which *are not used by the Defendants?*

We feel confident that your Honor will not, upon mere "*ex parte*" testimony, and without the aid of a thorough trial, feel disposed to decide such questions of fact against us; that you will not feel willing, upon *questions* of *mechanical science*, to pronounce the opinions of the ablest engineers and practical mechanics of the country erroneous; that you will not deny us the privilege of having the merits of the defence, now for the first time brought before the Court,—once at least passed upon by a Jury, if the Gentlemen on the opposite side still insist upon going further with this case. We think that your Honor, in the exercise of that sound judgment and discretion which are the peculiar attributes of a Court of Equity, will not allow an Injunction to go forth, to ruin the business and blast the prospects of the Defendants under such circumstances of injustice,—(an injunction,) which cannot be really beneficial to the Plaintiff, since the true merits of the case have never yet, been heard by a Jury of the country, or investigated by any Judicial tribunal. It is true that this case has, in part, been heard and adjudged; and upon that which has been heard, the decision has been in our favor. But when our opponents appear before your Honor and undertake to overcome the judgment of this Court by new efforts, we have shown that those efforts are worse than useless, since they have caused us to make further investigation, to develop new evidence, and to produce new testimony, which we think is destined to settle the fate of this controversy forever.

Sir, it is now the third time that the Plaintiff's have come before this tribunal, and we cannot but indulge the hope that the decision in this hearing will be such, that it will be the last time they will attempt to harass the Respondents.

And, in conclusion, I have only to thank your Honor most sincerely for the unfailing patience and constant attention with which you have listened to the evidence and the arguments we have offered.

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ERRATA.

In the hurry of passing through the press, several errors have crept in. We indicate the most important.

On the title page, instead of patent for "THE" eight-wheel car, read "AN" eight-wheel car.

In a part of the edition, p. 27, 9th line from the bottom, for "invalid," read "valid;" also, p. 28, 10th line from the bottom, for "patent," read "extension."

p. 31, line 3d from the bottom, after "other," insert "are."

p. 33, line 20, for "inventor," read "patentee."

p. 42, line 25, after 8 wheel, insert "cars;" line 29, transpose "the" before "wood."

p. 43, line 6, dele "alone."

p. 44, line 2, after bearings, insert "in;" line 21, for Plaintiff, read "Plaintiff's invention."

p. 71, line 17, for "whether the body be short; so that the eight wheels need not be long or equi-distant," read "whether the body *be short or long*," &c.

p. 72, line 17, dele "it."

p. 87, line 24, dele "he."

p. 89, line 18, for "Plaintiff," read "Defendants' rely."

p. 111, line 1, for "Baltimore cars," read "Allen cars."

p. 130, line 2, dele period and capital T.

EXTRACTS FROM A

PRACTICAL TREATISE

ON

RAILROADS, CARRIAGES, &c.

BY THOMAS TREDGOLD,

Civil Engineer, Member of the Institution of Civil Engineers, &c.

LONDON:
Printed for Josiah Taylor, Architectural Library, 59 High Holborn. 1825.

Page 93. " CARRIAGES for common railroads are made strong, to resist the shocks they are exposed to at every change of velocity, and it is necessary to make the parts which come in contact, solid pieces, extending a little more than the length of the body of the carriage, and hooped at the extremities, to prevent splitting; but carriages for passengers and for various kinds of goods, must be provided with springs to reduce the force of these shocks."

Page 94. " Small carriages must obviously be both heavier and more expensive, in proportion, than large ones. But as the stress on a wheel must be limited on a railroad, we cannot much enlarge the carriages without adding to the number of wheels.

EIGHT-WHEELED CARRIAGES.

When a carriage has more than four wheels, the body must be sustained so that its pressure may be divided equally among the wheels. In the case where eight wheels are applied to support one body, if the body rests upon the wheel frame, of each set of four wheels, in the middle of its length; (see Fig. 26, Plate IV.) and is connected with those frames so as to allow the greatest possible change of level on the rails, it is obvious that each wheel must bear an equal pressure."

Page 95. "The load on each wheel must be limited to suit the strength of the rails; it will seldom exceed two tons on a wheel, nor be less than half a ton. The size of the axles may therefore vary from 2·2 inches to 3·5 inches. Perhaps the most advantageous load will be about 1¼ tons on each wheel, which will require an axis of three inches diameter."

Page 179. Plate IV. Fig. 26. A diagram to show how a wagon may be made with eight wheels, so that the stress of each wheel on the rails of a railroad may be equal. The body of the wagon rests on the wheel frames at AA, and is connected to them by an axis on which the frames turn, when from any inequality, the axes of the wheels are not in the same plane. See page 94. (*See Diagram.*)

Pages 12, 13. "The Hetton railway is one of the principal ones." "In some parts near the staiths we observed malleable iron rails, in 15 feet lengths, supported at every three feet, (see Figs. 9 and 10.) They are 3½ inches deep in the middle between the supports, and 2¼ inches in breadth at the upper surface; one yard in length weighs about 28 lbs.

The wheels of the coal-wagons are 2 feet 11 inches in diameter, with 10 spokes, and weigh 2¾ cwt.; and their axles are 3 inches in diameter, and revolve in fixed bushes."

"The weight of the engine is about eight tons, (see Fig. 2, Plate I.)" "The boiler is supported on the carriage by four floating pistons, which answer the purpose of springs in equalizing the pressure on the wheels, and softening the jerks of the carriage."

Pages 118, 119, 120, 121. "The extent of land required for a railroad must depend on the breadth and number of the tracks. The breadth of the track has rather been determined by opinion, than as a question arising out of the circumstances of the case. But it must be obvious, that the breadth of the track ought to have some relation to the height of the load, in order that the carriage may be always in stable equilibrium on the rails; and in railroads there is another circumstance to be considered, the pressure on the rails should not be materially altered by any slight depression of one side of the road. It may be taken as a general rule for the width between the rails for carriages travelling at a greater speed than five miles per hour, that the centre of gravity should not be higher in proportion to the breadth between the rails than as 1 is to 1½; but they are often so constructed that the height of the centre is equal, or nearly equal, to the breadth between the rails; and with this proportion, in slow motions, no ill consequences may probably occur; but in rapid motions the centre of gravity must be kept at least within the limits we have mentioned, or there will be much risk of the carriage being overthrown by a very small obstruction. On a common road, the great resistance at the surface of the wheels, and the force of the moving power, tend to keep the carriage from upsetting; but on a railway, the smallness of the moving force and little increase of resistance to the wheel which takes the stress, render them insufficient to balance the momentum the carriage acquires by striking on an obstruction; besides, the connection of the moving force is not so favorable for drawing the carriage back to its position. All these circumstances demand the serious attention of the engineer who has to conduct a railway where the carriages are to proceed at the rate of ten miles an hour.

"The width between the rails being therefore dependent on the height of the centre of gravity of the loaded carriages, and this again varying with the nature of the load and the velocity, it will be obvious we cannot do better than make the breadth between the rails such, that, by disposal of the load, the centre of gravity may be kept within the proper limit in either species of vehicle, whether swift or slow. And it would be desirable that the same breadth and the same stress on a wheel should be adopted in all railways. We would propose four feet six inches between the rails for heavy goods, and six feet for light carriages, to go at greater speed." "In all railroads it is necessary that there should be passing-places at certain parts of the road, and in single tracks they should be very frequent."

Page 127. "Example. If the distance of the supports be three feet," &c.

Page 130. "If the distance of the supports be three feet," &c.

Page 126. "The distance between the wheels of the carriages should be such that the unsupported part of a rail should have to carry only one wheel."

Page 133. "Now, it is obvious that if any support be incapable of sustaining half the weight of the wagon without injury, it is insufficient for the purpose; consequently if the supports be ever so numerous, the same degree of firmness becomes necessary, as if they were at a great distance apart."

Page 101. "In proportioning the body of a carriage, it should be kept in view that the load should be as low as possible."

Page 173. "For carriages on springs, and steam carriages, consider the stress," &c.

Page 174. "Where the heaviest carriages are on springs, or floating pistons, two-thirds of the actual load on each wheel may be considered the stress on the rail for ordinary purposes," &c.

Page 12. "The Hetton railway is one of the principal ones." "The rails of the straight parts of the railway weigh 61 lbs. each; but this was found to be too slight for the curved parts, therefore the strength of the latter has been increased," &c.

Page 135. "When a considerable degree of curvature is given to a railroad, the rails of the outer curve should have a slight rise to the middle of the curve, and the rails should be stronger in a lateral direction in both lines. The object in making a slight ascent to the middle of the curve of the outer rail, is to counteract the tendency of the carriage to proceed in a straight direction, without its rubbing so forcibly against the guides as we have observed in cases where roads have had a considerable curvature."

Pages 42, 43. "It often happens, that a great part of the resistance at the rails arises from the lateral rubbing of the guides of the wheels; therefore it is desirable to give the wheels a tendency to keep in their path with as little assistance from the guides as possible.

"For edge-rail carriages this may be accomplished by making the rims of the wheels slightly conical, or rather curved, as shown in Fig. 24; the carriage will then return of itself to its proper position on the rails, if it be disturbed from it by any irregularity."

THE
REPERTORY
OF
ARTS, MANUFACTURES,
AND
AGRICULTURE.

No. CXLI. SECOND SERIES. Feb. 1814.

Specification of the Patent granted to William Chapman, *of Murton-House, in the County of Durham, now of Newcastle upon Tyne, Civil Engineer; and* Edward Walton Chapman, *of Willington-Ropery, in the Parish of Walls-end, in the County of Northumberland, Rope-maker, for a Method, or Methods, of facilitating the Means, and reducing the Expense of Carriage on Railways and other Roads.*

Dated December 30, 1812.

With a Plate.

To all to whom these presents shall come, &c. Now know ye, that we the said William Chapman and Edward Walton Chapman, do hereby describe the nature of our said invention, and that the same is to be performed and carried into effect in manner following; that is to say: Our said invention doth chiefly consist in the use of a chain or other flexible and continuous substance stretched along the road to be travelled, properly secured at each end, and at suitable intervals; and in the application of this chain round, or partially round, a barrel or grooved wheel, in such a manner as not to slip when this grooved wheel, which is fixed upon, before, or behind, a carriage, supporting or containing any internal self-moving power, shall be put in motion by the said power, so that by the revolution of the barrel or grooved wheel round its axis, either one way or the other, it shall necessarily draw the said carriage, and any others which may be attached to it, within its powers of action.

We also, as the carriage containing the motive power will, thus loaded, be too heavy in various cases for the strength of the existing iron or wooden rails, if resting on four wheels only, so arrange it for such ways (or other confined ways, where the ledges either of the ways or of the wheels regulate the direction of the carriage) that it may rest equably, and move freely round curves or angles either on six or eight wheels, so as to reduce its pressure on each in the inverse proportion of its number of wheels. Having thus described the outlines of the separate leading parts of our invention, we shall proceed to the means of carrying them into effect.

Fig. 1, (Plate V.) in the annexed plan, is an elevation of a carriage containing the motive power, be it steam, inflammable gas, or what it may. 1 is a grooved wheel, round which the chain partially laps. This groove should be angular, and contain a number of Ys of iron or other substance of the form of the Roman letter V, with intervals between them, so that the chain, when pressed into the groove, shall not be liable to slip. 2, 2, are two guide sheaves, or pullies, under which the chain leads in each direction of the road, and above which it takes its course round as large a portion of the periphery of the wheel 1, as it conveniently can. It is evident, that on the advancing side of this wheel, the chain will be drawn tight into the groove; and that, unless the chain be kept heavily stretched, it will be slack on the retiring side, and consequently slip; to prevent which we press the chain

chain into the groove by either the wheel 3 or 4, accordingly as either of them shall be on the rear or retiring side. These compressing wheels may either have a rim suitable to go into the groove of the wheel 1, upon the chain, or these wheels may have suitable cogs, of sufficient breadth, to correspond with similar cross openings in the rims of the grooved wheel, sufficiently deep for the cogs of the former to press upon the chain. On inspection of Fig. 1, it will be seen that the alternate action of these wheels can be quickly effected by changing the position of the weight 5, to either before or behind its axis (whether it be that of the wheel 1, or another), as it is fixed on a lever with two short arms, so as on the change of position, to draw one of the pressing wheels into the groove (or one of its cogs across it), and retire the other from it; both these wheels being so supported, or placed, as to admit of the requisite change of position.

6 is a small pulley or sheave at the opposite end of the carriage, with or without side rollers, to guide the carriage when moving with that end foremost. The diameter of the pulley 6 should be as small as it conveniently may be, so as to enable it to pass over 7, 7, which are Ys or forks placed at certain intervals, into which the chain falls, and is held so as to resist the action of the carriages; but at the same time will rise out of any one of them, when the carriage approaches so near as to cause the line of chain between it and the fork to form a considerable angle below the horizon. 7 *a*, is a transverse elevation of the fork (upon a larger scale) shewing the vertical slit in which, after being guided there by the oblique arms of the fork, the chain rests by the gravity of the part suspended, or supported on that point. 7 *b*, shews in plan, the position of the chain, with one of its links vertically in the slit. These forks will only be necessary at

certain

certain intervals, where 3 or 4 of them may be placed 5 or 10 yards asunder, so as to admit of sufficient length of chain to press it into the groove by its weight, and give a moral certainty of some one of them holding. They will be particularly useful when several loco-motive engines, with their trains of carriages, follow each other in succession; and also, in situations where the road varies its degree of ascent, because where it does so materially, stronger chains may then be used in the steeper parts, as the increased action cannot extend beyond the forks. The ends of the chain may be tightened by small horizontal barrels or windlasses, which, if on the railway, should be low enough for the axles of the carriages to pass over; and wherever high roads are passed, or carriages have to cross the line of chain, it should fall into a proper groove or channel to prevent its being injured.

If in place of passing the chain partially round a grooved wheel, in the manner described, it should be deemed eligible to give it one or more turns round a barrel, it will be necessary to prevent the progressive revolutions of the chain from passing to one end of it. One of the means of effecting this will be to place longitudinally upon the barrel six or eight chocks or wedges, of hard wood or metal, declining towards one end as in a capstan, so that the chain may slide in the line of the axis, and keep a proper position without over-lapping itself. It is obvious that carriages using the same chain cannot pass each other in any direction; therefore there must either be two railways, one for each direction; or the alternate conveyance must take place at the termination of given stages or lengths of way, which, to keep up a regular and uninterrupted succession, should be performed in equal portions of time. We shall now give an example of each, suited to railways of wood or iron.

Two

Two parallel ways, with their respective chains, are easily conceived. The only difficulties lie in the terminations from whence all the successive carriages return, and in places where, to avoid additional expence in deep cuts through high ground, in embankments, or in frame work over vallies, one road is made to serve both ways.

Fig. II. shews the termination of a double way, in which every loco-motive engine, with its train of waggons, may travel the whole distance. The strong parallel lines shew the way upon which the carriages have travelled to this termination; and the strongly *dotted* or *broken* parallel *lines* shew that on which the *return carriages* are to go; *these carriages* are expressed by the Roman capitals N, N, in similar lines, and are there ready to be taken off by the loco-motive engine shewn by the Roman letter M, attached by the line *u*, *v*, to the train of carriages shewn by the capitals N, N, in strong lines, which it has just brought to their termination, so as to admit their going individually and uninterruptedly to their adjacent place of loading or delivery, whichever it may be. In this and the subsequent figures, shewing parts of railways, ':' denote the forks already described; '*o*,' shews the position of an upright short post, to guide the chain upon the way where there is any curve or angle, and which post must necessarily be on the concave side of the bend of the chain; '||' shews the termination of the chain, either with or without a windlass.

The position of the chain is shown by a small waved line thus, ∿∿∿∿. Fig. II. also shows that the loco-motive engine has travelled to its termination on a continuous line of railway, whilst the waggons attached to it have, to admit their being taken away without impediment, been drawn on to the road parallel to it. To effect this, the engine, before it arrives at the point *a*, where is laid out in successive stages, so that only one engine travels on each, and returns with the carriages brought to it from the adjacent stage, then a single way only is requisite, excepting at their point of interchange, which may be so managed as to be done simply by an easy transfer of the carriages, without any detaching of the ground chains, for which see Fig. IV, where the railways of the two stages are made simply to overlap each other for a due extent, to hold the carriages. They must have from each end, as shewn by the strongly dotted or broken lines, a converging or slanting communciation with each other, along which each engine, by its lengthened track line, drags its train of waggons (as in the explanation of Fig. II.) ready to be taken onwards by the opposite engine.

It will obviously occur, that one stage will be sufficient in short distances, or even in longer ones, with a correspondent reduction of the quantity to be daily conveyed. And likewise that more than one loco-motive engine may be employed on the same stage of a single way, provided they follow each other in close succession both ways; or if the first, in one direction, become the last in the other.

Whenever two collieries send their coals down the same waggon-way, and that way a double one, then on the system of stages, each colliery may appropriate one of the ways to its own separate use; and should it so happen, that these ways in particular places unite in one, the difficulty of entanglement of their chains may be easily done away, by each colliery having the drawing forward apparatus of its loco-motive engine a few inches beyond their middle, towards the side most distant from each other; or it may be done by the method described in Fig. 3.

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▬ The Loader and a
▨ Line of Waggons.
••••• Its Chains.

----- The Light or returni

+++++ Its Chain.

M The Locomotive or a

N N The Waggons or Carr
by Ditto.

8 A Y or Holdfast of th

0 An Axis or Winlaſs t
End of the Chain is a

O Guide Posts.

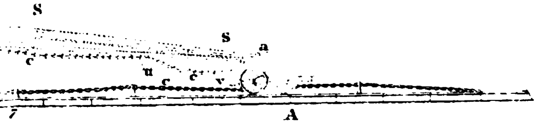
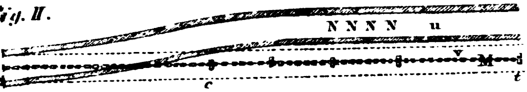


Fig. II.



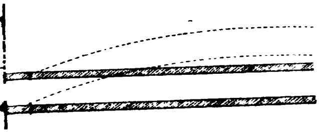
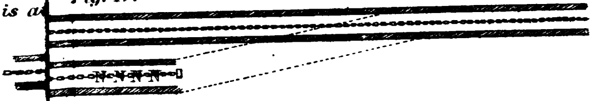
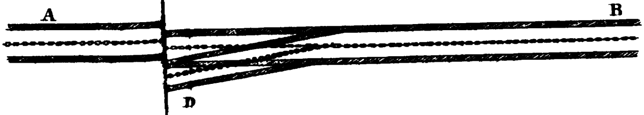
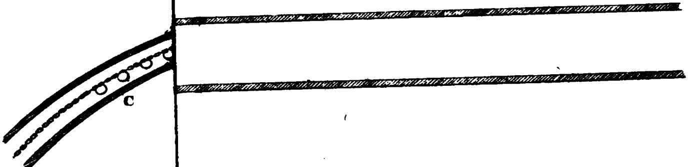


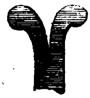
Fig. IV.







7. a.



7. b.

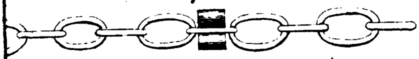
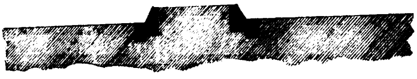
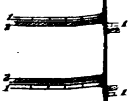


Fig. VII.





Where coals from the same colliery are sent from different pits, some inconvenience, but easily superable, will arise at the junction of the branches. If this junction be at such distance from each pit as to make a stage, the whole process will be sufficiently easy from what has already been explained. If otherwise, let AB and CD, Fig. 5, denote the two branches and their junctions. The chain, if the loco-motive engine travels to each pit, may previously to the arrival of the engine from the termination of the conjoint stage, be prepared without delay to its passage along any branch; it requiring only the means described in the explanation of Fig. II. which may be carried into effect during the absence of the engine. Or if the branch CD be short, the loaden waggons may be brought upon it close to the junction by horses, or other animal power, so as to be ready to be taken away by the engine, which previously to its doing so, may, by lengthening its track line, draw the light waggons into the bye-way or siding *g*, *h*, ready to be taken away from thence by the horses which bring the loaden ones.

To enlarge further on the methods necessary for change of conveyance along railways, would be superfluous, as the explanations are already sufficiently explicit for those conversant in them; and it is also obvious, that whenever expedient, one engine may be made to travel two or more stages, by simply uniting the chains at the ends of each stage.

There yet remains to be pointed out, the application of our method to high roads, which is more peculiarly suitable where the roads are tolerably level, and the materials for repairing them bad or expensive. If these roads be of suitable width, they may be left for general purposes. except a narrow space on one side, not much more than the width of a foot path, which will answer for conveyance by alternate stages.

Fig. VI. shews the plan of an eligible road for this purpose, and Fig. VII. its profile or transverse section, in both of which the references are the same. 1, 1, are two parallel rows *of large* paving stones, of Scotch or other granite, at a suitable distance, for the tread of carriage wheels. 2, 2, ranges of hard smooth stones, or other substances, bevelled in their face, and rising three or four inches above the level of the pavement, so as to guide the carriage wheels from getting off the way. *c*, *d*, is a pavement over any cross road, with a groove in the middle for the chain to fall into. The guide stones on each entrance from this cross-way, form the extrados or outside of a Gothic arch, both for the purpose of admitting carriages to quit the chain road at these places, and to direct them fairly on to it. These roads may pass through villages; but must necessarily pass by, or terminate at towns, in which case the terminations will be similar to one of the divisions of Fig. VI. and the locomotive engine must pass so far on to the pavement as to admit at least the foremost carriage of its train to be drawn off clear of the way. Then on the engine's return to its chain road, or even previously to it, the returning train of carriages may be fixed to its other end. As the engine may have appendages to clear away any impediments in the track of its wheels, and nothing can be thrown out of geer by its motion, it is evident that on a well-made chain road, it may travel, with its train of carriages, at the rate of 7 or 8 miles an hour. The preference of the road last described must depend on its comparative cheapness, because a tram-way, viz. one formed of flat iron rails, with a rising ledge, has, unless for very heavy carriages, superior advantages.

Fig. VIII. shews a carriage of six wheels for the engine, which may rest equably, or nearly so, on each of its wheels, and move freely round the curves or past the angles of a railway. 1, 1, the fore pair of wheels, are, as usual on railways, fixed to the body of the carriage; 2, 2, and 3, 3, the other two pair, are fixed (on axles parallel to each other) to a separate frame, over which the body of the carriage should be so poised, as that two-thirds of its weight should lie over the central point of the four wheels, where the pivot 4 is placed, and the remaining third over the axis 1, 1. The two-thirds weight of the carriage should rest on conical wheels or rollers, bearing upon the curved plates *c*, *c*, so as to admit the ledges of the wheels, or those of the way, to guide them on its curves or past its angles, by forcing the transome or frame to turn on the pivot, and thus arrange the wheels to the course of the way, similarly to the carriage of a coal-waggon. And if the weight of the loco-motive engine should require eight wheels, it is only requisite to substitute in place of the axis 1, 1, a transome, such as described (laying the weight equably upon both) and then similarly to two coal-waggons attached together, the whole four pair of wheels will arrange themselves to the curves of the railway.

In using loco-motive steam or other engines for mines, there will be a want of draught for the fire under the boiler or air tubes, because of deficient height for the chimney or vertical flue; and also above ground, where necessary to pass under bridges, for high roads. We, in these instances of want of draught, attach to the loco-motive engine the blowing apparatus of a common winnowing machine, to force a current of air under the bars of the fire-place, which apparatus should of course receive its motion from the engine.

We have also invented a method of using an endless chain of limited length, for travelling an unlimited distance, an eligible method of using which is shewn by the dotted lines annexed to Fig. 1, which have not been mentioned in the explanation of it; but which will now be described. A is a carriage of four wheels (suitable to the railway) supported on which is little '*a*,' a short post or frame, with an eye bolt, or other point of connection with the end of a long spar, either of one piece, or framed hollow to make it light, and give it the power of lateral resistance; *s*, *s*, *s*, shew the outlines of this spar, which, accordingly to circumstances, may be 40, 50, or 60 feet long. One end of it, as already mentioned, is attached to the carriage A, which must be by a moveable joint, and the other end, *d*, must be attached in a similar manner to the fore part of the loco-motive engine; *v*, is a grooved wheel affixed to the carriage (shewn here for clearness at the tail of it, but which will be best in its centre) round which wheel the endless chain, shewn by the dotted lines, *c*, *c*, so far as it differs from the ground chain already described, passes and returns to the loco-motive engine, supported and directed by the pullies *u*, *u*, some of which are attached to the spar, and others to the engine carriage. In this plan, the counteraction to the engine's power must evidently be the forks, 7, 7, which of course must be continuous throughout the whole line of progress, and with intervals suited to the distance between the carriage A, or rather its wheel, *v*, and the guide pulley, 2, of the loco-motive engine. It is expedient, at least, that two of the forks, 7, 7, should have hold of the chain, and if they be five yards asunder, the spar, *s*, *s*, *s*, will be sufficient of fifty feet length; or if thought eligible, two lengths of spar may be used with an intervening carriage of support. The peculiar advantages

tages and disadvantages of this method, compared with those of the ground chain, will depend on local and adventitious circumstances.

When a rope, or other flexible substance, is used in the place of a chain, it will be necessary that knots or protuberances should be formed on this substitute, wherever it shall be expedient for it to be held by the forks mentioned in the description of Fig. 1.

It is already known to the public, that self-acting loco-motive engines have been used for the purposes of drawing carriages after them; but the object of this specification is not to include as our invention what has heretofore been publicly done, or granted to any preceding patentee, but simply to claim for the purposes explained, such position, application, and greater or less combination of the things mentioned, as falls within our description, so far as such combination has neither been publicly carried into effect, or been included in the specification of any prior letters patent granted to any person or persons whomsoever.

In witness whereof, &c.

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OBSERVATIONS BY THE PATENTEES.

The plan, described in the preceding specification, for reducing the expence of conveying coals along railways, will shortly be carried into execution on the waggon-way from Heaton colliery to the river Tyne. A principal feature in the advantages to be derived from the adoption of this patent is, that no alteration is required in the waggon-ways, whether of wood or iron; because, if strong enough to sustain the coal waggons, which they necessarily must be, they will be amply capable of supporting the loco-motive engine, when placed on six or eight

eight wheels, accordingly as its weight may require; and thus the alternative, hitherto labored under, will be obviated: *viz.* either that of the weight of the engine destroying numerous rails, or the total renovation of the way, by laying new rails, at a great charge.

Any gentleman disposed to carry this plan into effect, will receive every requisite information, on applying to Messrs. Chapman and Buddle, Newcastle upon Tyne.

A

PRACTICAL TREATISE

ON

RAIL ROADS AND CARRIAGES, &c.

BY THOMAS TREDGOLD.

LONDON:
1825.

Eight-Wheeled Carriages.

When a carriage has more than four wheels, the body must be sustained so that its pressure may be divided equally among the wheels. In the case where 8 wheels are applied to support one body, if the body rests upon the wheel frame, of each set of four wheels, in the middle of its length; (see fig. 26, Plate IV.) and is connected with those frames so as to allow the greatest possible change of level on the rails, it is obvious that each wheel must bear an equal pressure. If one frame with its four wheels be removed, and an axis with two wheels applied in its place, the carriage would have 6 wheels; and it would be easy to adjust the load so that the pressure on each pair of wheels would be equal.

p. 94.

DESCRIPTION OF PLATE IV.

Fig. 26. A diagram to shew how a waggon may be made with 8 wheels, so that the stress of each wheel on the rails of a rail-road may be equal. The body of the waggon rests on the wheel frames at A A, and is connected to them by an axis on which the frames turn when, from any inequality, the axes of the wheels are not in the same plane. See p. 94.

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